

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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LONDON, SATURDAY, AUGUST 17, 1878.

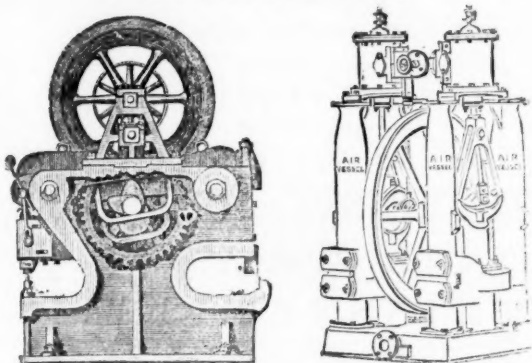
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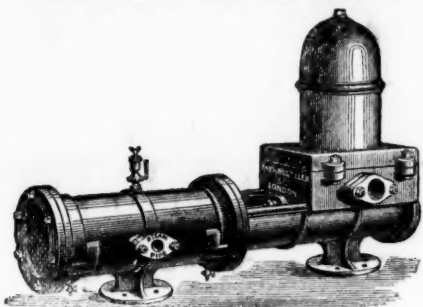
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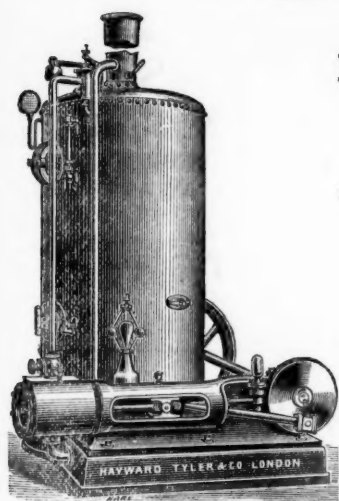
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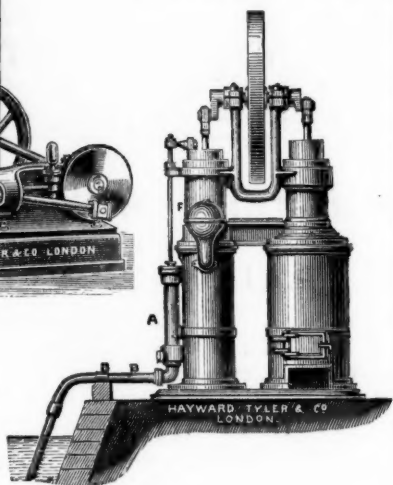


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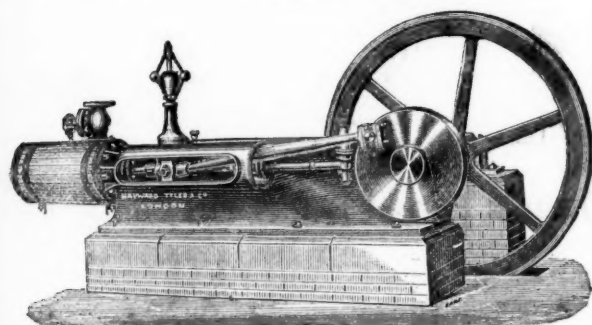
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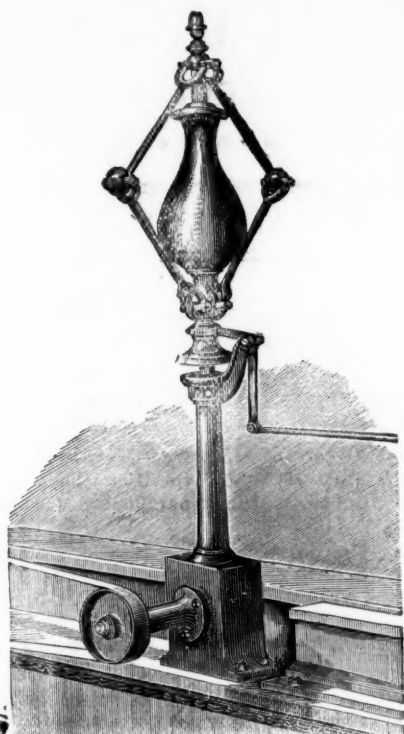
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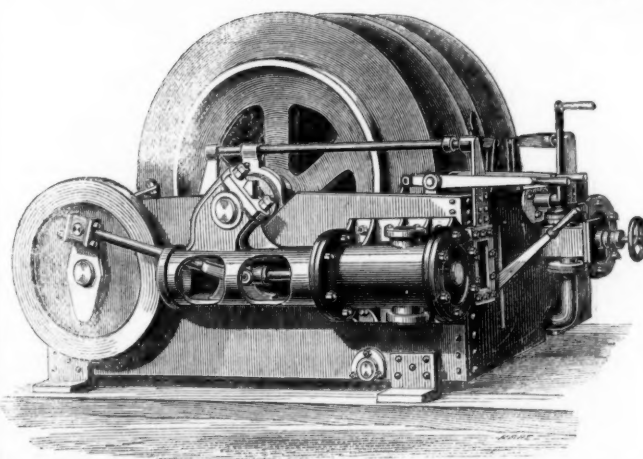
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Original Correspondence.

NEW QUEBRADA COMPANY.

In fulfilment of the promise made at the recent general meeting, the report of the superintendent—Mr. W. J. Holman—made after two months' residence on the property, has been forwarded to the shareholders, and is regarded by the board and by Mr. Darlington as of a favourable character. Mr. Holman states that Tucacas, where the ores are shipped, is 32 miles from Puerto Cabello; a Bolivar Railway Company's steamer runs regularly between the ports. Opposite Tucacas ore ships of more than 250 tons have to anchor nearly one mile from the shore, flat-bottomed barges being employed to transport the ore from the wharf to the ships. A landing stage has been constructed by the railway company, so that the small steamer and other boats drawing 10 ft. of water can be brought alongside to discharge cargo, &c. Close to the landing stage are the ore wharves for depositing copper ore when there are no ships in port and when the quantity of ore sent from the mines exceeds the storing capacity of the ore boxes, which, when taken off the railway wagons, are piled on each other. Each box contains 1½ ton of copper ore, and a railway wagon carries two of them. The ore floors are exceedingly rough, no pavement of any kind having been provided to secure the ore from admixture with debris when reloading into boxes or barges to be taken off to the ships. Attention should be given to this subject as soon as possible. The ground lying between Tucacas and La Luz, known as the Aroa Valley, is covered with a dense forest, and through this a space of 80 ft. wide has been cleared for the Bolivar Railway. Except in the immediate vicinity of Palma Sola and La Hacha stations, the ground is entirely uncultivated.

Since the completion of the railway to La Luz this village has considerably increased in importance, being the point at which the goods are received and dispatched to and from Barquisimeto and other places in the interior. Plots of land are also now being cleared by the poorer people, and coffee, maize, and plantains are produced in quantities sufficient for the requirements of the place. The gradients on the line from Tucacas to La Luz are comparatively easy, whilst those from La Luz to the mines are from 1 in 50 to 1 in 25. From La Luz to the mines the line is very tortuous, and heavy cuttings and embankments had to be made, 13 iron bridges had to be erected, varying in span from 20 to 90 ft., two of which are across the Aroa river. From Tucacas to La Luz the rails are rather light in section, being only 30 lbs. to the yard; this, however, is increased to 50 lbs. to the yard in the distance from La Luz to the mines. The gauge of the railway is 2 ft. throughout. Ordinary locomotives are used from Tucacas to La Luz, but from that place to the mines the work is done by Fairlie engines. From 30 to 50 minutes are occupied in running from the mines to La Luz, and the ordinary load from 40 to 50 tons of ore; this quantity is, however, increased on the section between La Luz and Tucacas stations. The railways was completed to the mines in October last, since which time regular monthly supplies of ore have been sent over it, amounting in the aggregate to 3300 tons.

The mines of the most importance belonging to the company are the Orea and Titiaira, Comaragua and San Antonio being for the moment unimportant. The mines are confined to a tract of country 7 miles long and 3 miles wide, commencing with the Comaragua the mines succeed each other in a southerly direction. The rocks in the vicinity of all the mines are very nearly similar, and consist of limestone and mica schist, the former occasionally presenting a semi-crystalline appearance, with strings and strong deposits of quartz at irregular intervals, and the latter varying from a light bluish colour when compact to a dark grey when somewhat decomposed, and of a crumbly nature, as it is sometimes found when approaching deposits of copper ores. He has been unable to learn that any fossils or shells have been found anywhere in the vicinity of the mines, consequently it is most difficult to determine the age of the limestone, but he is inclined to believe that the mica schist will be found resting on the granite, and from the number of boulders of the latter rock to be found in the Aroa river both above and below the mines, it may be that the junction of the two rocks is not far distant from the lodes.

The general direction of the lodes is north and south, and underlies west, varying in width from 6 to 140 ft. At present it is impossible to determine the exact direction of the walls of the lodes, as they can only be seen in a few places, it is important that this should be ascertained in future workings of the mines, particularly at Aroa and Titiaira. The order in which the copper occurs, descending from the upper workings is:—(a) Blue and green carbonate, (b) red oxide and metallic copper, (c) black oxide, and (d) copper pyrites or yellow ore. The junction of the oxide of copper and the yellow ore in the vicinity of the ruby saloons in the Aroa Mine, occurs about 50 ft. above the Santa Catalina level, but they have also the fact that the oxides of copper extend in depth, as is shown in the Germans' deposit in the southern end of the deep level of the Aroa Mine, where the deposit of copper ore is 60 feet long and 8 feet wide.

The mountain in which the Aroa Mine is situated is so covered with trees and dense undergrowth that no trace of outcrop can be seen. About 300 yards south of the Santa Catalina level the river crosses the course of the lode, which appears to be a continuation of the lode from Aroa Mine. Smelting with charcoal appears to have been carried on by the Spaniards, and more recently Woolf, a German, erected a furnace at Casa de Teja, probably to smelt the richest portions of yellow ore, but he did not succeed, and the works were abandoned. A sample from one of the heaps near this furnace gave 11½ per cent. of copper; if the bulk be found equal to this it will be sent forward with the other ores from the mines: 10 fms. above the northern end of the Santa Catalina level are extensive workings, known as the Upper and Lower Ruby saloons, and which are immense openings in the lode, and no doubt represent the places from which the richer portions have from time to time been taken away by the various parties who have worked the mines. The exploratory work recommended by Mr. Darlington north of these saloons has resulted in the discovery of a rich deposit of ore, from which some 400 tons are now being taken monthly, and varying in quality from 8 to 25 per cent., the average being about 16 per cent. Through the complicated nature of the workings it is most difficult to estimate correctly the available quantity of ore at this place, but our present output will, no doubt, be continued for some time, and it is probable that as the exploratory work is continued north other deposits of equally rich ore may be met with. The quantity of broken ore of various classes distributed through the old workings and levels cannot be estimated with anything like accuracy, but from a general view of the places it may be put down roughly at (say) 5000 tons.

The ore in reserve is thus estimated by Mr. Holman: Ruby ore, broken and distributed through old workings in the various Ruby saloons (say), 1500 tons; unbroken ore included in the upper and lower Ruby saloons (say), 7000 tons; yellow ore, broken and distributed through old workings in various places (say), 3500 tons; unbroken ore included in the ground from bottom of ruby ore to deep level and advancing northwards to end of level (say), 90,000 tons—(approximate) total, 102,000 tons. Various assays made from samples of yellow ore broken from a large number of places have shown that the ore is not of uniform percentage, making it most difficult to arrive at a correct estimate of the value of the lode. The assays vary from 2 to 20 per cent. copper. There is a large heap of yellow ore outside the mouth of the deep level from which he estimates they will be able to obtain 1000 tons of ore of 11 per cent. The pile of ore outside the mouth of Santa Catalina level is too poor to be taken into account, being principally composed of iron pyrites and limestone. About 500 tons of poor ruby ore are on the floors, a portion of which may be dressed up to 10 per cent.

The quantity of ore the mines are capable of producing from June 1 to Dec. 31 of the present year he estimates at 6300 tons, which will probably be taken from the following places:—Ruby ore from the retreatment of old ore at surface, (say) 100 tons of 11 per cent.; from deep level extension, 100 tons of 18 per cent.; from lower ruby saloons, including that which may be selected from rejected ore,

1900 tons of 13 per cent.; from upper saloon, off Carthew's shaft, 1050 tons of 13 per cent.; yellow ore that may be picked from heap outside deep level, 1000 tons of 11 per cent.; ore to be broken from the yellow ore saloon and from deep level north, 2150 tons of 11 per cent.: total, 6300 tons, averaging 11·90 per cent. copper.

The labour to be obtained in this country is very inferior. The best men for the mines are the foreigners, including French, Italians, and a small number of Germans. The native miners do not earn more than half the wages of a foreigner, notwithstanding they sometimes receive better prices per fathom for driving the same levels. Machinery should, wherever practicable, be introduced to supersede manual labour. In the report he has carefully gone into the various matters. Taking the mines as a whole he believes them to be good and capable of profitable extension. In conclusion, he has only to add that since his arrival at the mines he has received cordial assistance from Mr. Francis and the other officers at the mines. He quite believes all of them have the interests of the company at heart, and will do all in their power to promote the interests of the undertaking. It is mentioned that wet assays have been given throughout, and that 1½ per cent. must be deducted to reduce it to dry assay.

NEW QUEBRADA COMPANY.

Sir,—As a shareholder I have received a copy of Mr. Holman's report of his two months' experience as manager of the above-mentioned mines. On the whole it is encouraging, but it contains discrepancies. Having resided nearly three years on the property I can point out some of them:—1. There are plenty of old rails lying about to make a good flooring at Tucacas.—2. There is only one bridge across the Aroa river, and this is four miles below La Luz, at La Hacha.—3. Mr. Holman appears to have confounded the tributary to that river on which the mines are situated, called the "Quebrada de las Minas" (the mines being called "Las Minas de la Quebrada"), with the River Aroa. This Quebrada is bridged twice. Although the stream is wrongly named by Mr. Holman, I agree with him that the supply of water is sufficient, and, moreover, is never likely to fail.—4. The road mentioned by Mr. Holman to the Titiaira Mine is not on the right bank of the Titiaira stream, but on the left bank.—5. As I saw the barracks at the Casa de Teja built I should certainly think it unadvisable to remove them to the mines. They are built of "adobes," or unburnt bricks, which of course in the demolition would become disintegrated, and there would be nothing left to remove excepting the wood and tiles, so I do not see how that could pay. At the mines stone is abundant, run to spoil everywhere, and a zinc roof is cheap enough.

Timber also can be got on the spot for less than it would cost to transport that used in the barracks; in fact, this was principally got from the neighbourhood of the mines, I was there and saw it hauled down. I strongly counsel Mr. Holman not to demolish the barracks at the Casa de Teja. The day may not be far distant when he may find them extremely useful. Is his report thereon backed up by the medical officer? Besides they are on the farm, and on the spot chosen by Sir John Hawkshaw as his colony, and I do not consider his judgment should be despised.

GEORGE RANSOM,

Ex chief Resident Engineer of Construction of Bolivar Railway.

Belgrave-road, Aug. 13.

THE RICHMOND MINING COMPANY.

Sir,—I am much surprised that the directors of this company have taken no steps to place before the shareholders some reason for the heavy fall in the price of the shares. All kinds of rumours are circulated—some that water is in the mine, and coming on the works faster than it can be pumped; another says something is wrong, and the works will be stopped. If these are mere idle tales set about for a purpose a short circular from the board would be sufficient to allay any fears felt by the shareholders.

A SHAREHOLDER.

THE RICHMOND MINING COMPANY.

Sir,—Mr. Brereton's letter in reference to the respective positions of the Richmond Consolidated Mining Company and the Richmond Company of Nevada contains serious inaccuracies, which it is important to correct, and erroneous conclusions it is essential to refute. So far from the shareholders being kept in ignorance of any of the facts connected with the transaction, each one was informed by circular in November, 1873, of what had been effected under the advice of five eminent lawyers in America, sanctioned by the company's legal advisers in England; the number of shares in the Nevada Company was given, and the proportion named of those issued as a qualification for the president and other officials. At the annual meeting in November, 1873, I, as Chairman, gave a full statement to the reasons that led to the step being taken, and the shareholders present unanimously endorsed the action taken by the board. Mr. Brereton quotes part of that statement, but is wrong in attributing to me the remark that "By the laws of the States no alien can hold a patent under the States." I was too well acquainted with the facts to have said that; what I did say was that "No alien could obtain a patent in America, but that he could hold patented mining ground, conveyed to him after the patent was granted."

The Richmond board stipulated, before accepting the vendors' title, that it should be examined, and the property surveyed by agents of their own selection. Mr. Streeter, an English barrister, was deputed to go out and make the requisite enquiries, and I impressed on him the absolute necessity of seeing that the patent was obtained before completing the transfer. He took it on himself, unfortunately, to accept the title without a patent, and informed the board that he had ascertained in America that a patent was of no moment. The consequence was that the property had to be deeded over to Prof. Fisher, our then manager, who obtained a patent in his own name, and then announced his intention to keep the property for himself, a resolve he was only induced to forego by the vigorous action of Mr. Clarence King and Mr. Probert, and the payment of 2000*l.* as "compensation." The transfer of the property was then made to Mr. Clarence King, as other mines were being acquired, and for which other patents would be needed. Mr. King not being able to remain as manager, it was decided to organise an American incorporation, and to that institution Mr. King assigned the property, then vested solely in him. Every step taken was done under the highest advice, and no stipulations were made that would have jeopardised the arrangement. It is thus quite true that the Nevada Incorporation, through its officers, has absolute control over the property, irrespective of the English Richmond Company, considered as a company, which is simply in the position of a shareholder holding all the stock but five shares, and is, therefore, endowed with a power which for all practical purposes is ample and absolute.

The validity of the arrangement has been tested and confirmed in the American Court. Judge, then Prof. Price and Mr. Probert constitute the board of the Richmond Company of Nevada. Mr. Probert, who is also a director of the English Richmond Company, holds on its behalf proxies representing 10,995 shares out of 11,000. The English board having implicit faith in Mr. Probert's integrity, considered such an arrangement entirely satisfactory. The documents in the office laid before the committee must have informed them of all the facts, and in their report they gave the annual cost of the American incorporation. In February, 1876, the properties for which patents had been obtained were deeded over to the English Company, and for reasons connected with the suit subsequently instituted by the Eureka Consolidated Company, a re-conveyance was executed to the Richmond Company of Nevada. The Eureka Company during the trial examined Mr. Probert and Judge Wren, with the object of upsetting the legal status of the American Richmond Company, and the answers obtained must be taken as the technical legal definitions of its position.

The Queen's Attorney-General if examined would testify that she could do no wrong, that she has the power of making war and declaring peace; practically we all know how that power—which it is essential should exist, which it is treason to dispute, but which may be abused—is efficiently controlled.

The Richmond shareholders have received in dividends 6*l.* 1*s.* 6*d.* for each 5*l.* share, and, if the suicidal course taken by the committee does not prevent it, have a brilliant prospect for the future. If the Richmond board in past times had shrank from assuming responsibilities most assuredly not one pound of the shareholders' capital would ever been returned to them. It is still more certain that those responsibilities never would have been incurred by the board had the possibility been foreseen of the production of a "report" containing such an unfair attack on their motives, and such a total ignoring of the great measure of success attained under unexampled difficulties.

Mr. Brereton need not impute to Mr. Hopkins any dread of the consequences from the American incorporation as a reason for refusing to sign the report in its entirety, the gross injustice done in it to himself and his colleagues was quite sufficient motive to justify his protest.—Aug. 16.

JOHN ELLIOTT.

THE RICHMOND MINING COMPANY.

Sir,—I find the following very sensible editorial remarks in the New York Engineering and Mining Journal of July 20 last, which Richmond shareholders, who desire to follow Mr. McEwen's proposition of increasing their capital stock, will do well to consider—"To enlarge the capital stock of a mining company on the strength of a 'bonanza' is a perilous business. The bonanza is sure to be worked out in due time; the extra stock is then represented by a hole in the ground; and the speculation which has been stimulated by its issue reacts with frightful force upon the company. Let our English friends, if they have no examples nearer home, study the recent history of the leading Comstock Mines, and thank the good sense of their directors that the Richmond is not yet on the fatal road of inflation." The two leading Comstock Mines—the California and the Consolidated Virginia—had their capital stock increased in 1876 from 108,000 shares each to 540,000. At that time the market value of their shares stood at 15*l.* per share on the enlarged capital, and they stand to-day under 2*l.* per share; and the bonanza is well nigh exhausted.—Aug. 16.

SHAREHOLDER.

RICHMOND CONSOLIDATED MINING COMPANY.

Sir,—Have we a mine? That is the discussed question among shareholders. According to the evidence of the Richmond Mining Company of Nevada, as exemplified by the evidence of Messrs. Probert and Wren produced by Mr. Brereton in the Journal of last week, we do not own a mine, but *cui bono* publish our want of title. I am credibly informed that Mr. Brereton has sold all his shares, individually I am not sorry that I have been made aware of the position, for I immediately took steps to part with my holding. Mr. Probert is made to state distinctly on oath that the mine is not the property of the above company. If that is true, where are we? If not true, what is the value of what we thought to be our property in the hands of a trustee whose evidence on oath is hypothetically put to one side? The reported flooding of the mine is a joke to this. The debenture-holders will have something to say to Mr. Vallance and the board for having transferred the mine to the Richmond Mining Company of Nevada.

RETIRING SHAREHOLDER.

THE BRITISH AND AMERICAN IRON TRADES—ONE-SIDED FREE TRADE.

Sir,—I enclose you the following extract from the Troy Times:—HOW PROTECTION RUINS THE STATES.—The Troy Times of July 26 thus tells how protected manufactures are looking up in that city:—"The indications now are that all persons engaged in the iron mills or foundries of this city will have continued employment all the fall and a greater part of the winter. Regarding the mills of the Messrs. Burden we are informed it is probable they will be run all the winter on full time, with, perhaps, a few unimportant interruptions for ordinary repairs. At Corning and Company's mills, the steelworks and Renesse-lar works will, no doubt, be kept continually busy, while the Star forge and the old mill will run alternate weeks, as heretofore. The stove manufacturers report their business much better than it was last year, and all the principal foundries in the city will doubtless continue running until Christmas, when there will be the customary two weeks suspension for repairs. So it will be seen that, on the whole, the prospect is much better than it was last season, and that at least a measure of the old-time prosperity, so far as the iron industry is concerned, is returning to Troy. The shirt and collar manufacturers are also quite full of work."

We ask any candid man, even if he is a supporter of Mr. Mackenzie, to say whether any such prospect of work for the winter appears in any city in Canada. By the Canadian census of 1871 there were 64,500 American-born people in this country. By the United States census there were 450,000 Canadian-born people there. Now, the question for Mr. Edgar's debating society is—If free trade is good and protection evil, what diabolism induced 4,000,000 free traders to send 450,000 of their number to a protective country, while 40,000,000 protectionists sent only 65,000 of their number to a free trade country? The effect of one-sided free trade on the British iron trade has been the importation of Belgian iron even into British ironworks (the Bowling Iron Company's new sheds), the incessant troubles and strikes in the trade, the impoverishment of the labourers and the country, and the closing altogether of many ironworks, where under a proper system of protection the Belgian works would have been shut up instead of ours. In fact, the rage for cheapness fomented by the bright apostles of the free trade propaganda in this country has not taken into consideration at whose cost this cheapness has been brought about, and the consequent diversion of gold into continental channels instead of English ones, and Paris made the great cash-box instead of London, as can be in any week seen by the returns of the Bank of England and the Bank of France—now the exact reverse of what the figures were when we fought on a fair ground with foreigners, and manufactured for ourselves. Not content with one-sided free trade, the French have encouraged the growing of beet-root, and exchanging it when made into sugar for English gold at prices below what the British manufacturer can make it at, in consequence of the bounty given by the French Government on beet-root sugar, made not for home consumption, but only foreign exported sugar, and by such means an attempt is made to ruin English manufacturers, and divert the trade into French hands, and yet Mr. Leon Say has the cool impudence to tell us that the French nation are paying this duty in order to let Englishmen generally buy their sugar cheap. How very kind of the French! How we ought to thank them for growing beet-root and cheap sugar for us, and taking our gold and ruining our sugar manufacturing trade! Why, Sir, even Mr. Gladstone, the Grand High Priest of Free Trade (in foreign manufactured goods as well as raw material and articles of food) stated to the Bristol Committee—"Both the trades and workmen engaged in the business of refining sugar have reason to complain. My desire is that the British consumer should have sugar at the lowest price; but I cannot regard with favour any cheapness which is produced by concealed subsidies of a foreign State to a particular industry, and with the effect of crippling and distressing capitalists and workmen engaged in a lawful branch of British industry." What is the tax on British iron all over the Continent but a subsidy; and is not the assistance given by the German Government to the Krupp iron manufactures and to other manufactures of iron a concealed subsidy—and with all our sacrifices these foreigners are not yet content. They have tasted the honey, and cannot now be got to leave it; and I firmly believe that should we attempt to obtain anything like reciprocal fair play from the French they would wish to go to war with us, and fight us with the vast hoards of money which they have been collecting chiefly from us. The following opinion of a Canadian paper upon French trading may be interesting to your readers:—

Whenever English papers dilate to any extent on the subject of the progress of free trade ideas in France they make by implication admissions which prove how very small is the mole hill they are trying to magnify into a mountain. They have just recently had information that the report of the French Senate Committee on the commercial situation, now being published, "is not only anti-free trade, but is even aggressively hostile" towards the commercial treaties made under the Imperial regime. Still, they are comforted to know that the small band of French free-traders are working with great energy, and are presenting very strong arguments—arguments that must surely show good effect by and by. And among the strongest of these arguments are the following:—It was shown that during a term of years, with the English and other treaties in operation, raw materials stood for more than three-fifths, and food for more than a quarter, of France's total importations, whilst manufactured goods counted less than one-ninth, and "other merchandise" less than one-twentieth. This small proportion of manufactured goods, about eight millions sterling in actual amount, or say 2*l.* per head of the entire population of France, could not very much have interfered with the home market for home products. Again, to those who were alarmed by the fact that the importation of raw materials was nearly 18 per cent. more in the first five months in 1878 than in 1877 the obvious and conclusive reply was—"If our factories use more wool, silk, or cotton, or if we fetch from the foreigner more minerals, coals, oils, &c.—is that a sign of the aggravation of our industrial crisis? Or, must it not rather mean more wages for our workpeople and more

goods for our merchants to export?" And there were the figures to show that, of the total exports for the five months, their manufactured goods stood for more than one-half, or for nearly twenty-nine millions sterling, against the eight millions of manufactured they had imported. "And this," says an English journal, "is a method of treating the subject which will tell."

At present it tells the wrong way for the free traders. If such infinitesimal measure of free trade as that under which less than one-ninth of the total imports consisted of foreign manufactured goods causes grumbling and dissatisfaction among the French people, what might we expect were it proposed to so extend the system that imports of this class should count half of the whole? Why, there would be open rebellion—another revolution in fact. And if the French are such pronounced protectionists that any increase even in imports of raw materials is viewed with jealousy, if not with alarm, with what truth can it be said that free trade has any hold on them at all? The truth is that the French are the most thorough-going and systematic protectionists on the face of the earth. With figures in most cases below those of the American tariff the French tariff is by long odds the more practically protective of the two—the better adapted to fulfil the purpose of causing as much of everything to be made at home, and as little of everything to be imported from abroad as possible. And, in addition, French administration is as far before American as day is before night. No French *douane* dares to favour a political friend, as the risk of consequences. Look again at the stringency of the French method of preventing undervaluation. If the Customs authorities deem any certain invoice of goods much undervalued they may add 5 per cent. to the invoice, pay the increased amount to the owner, and sell the goods for the benefit of the Government. With this power in the hands of Customs-house experts few importers care to run the risk of undervaluation. So keen are the officers, too, in detecting all tricks of giving false names to new fabrics, in order to pass them at a lower rate of duty, that almost every attempt of the kind brings defeat and loss to those who try it. In the French tariff, and no less in the administration of it, we find this perfection of merit that both are found particularly strong at those points precisely where foreign manufacturers would wish to see them weak and easily evaded. This is the special grief of English manufacturers trying to find a market in France; but they are compelled in great part to smother their griefs for fear of too much discouraging the free trade propaganda.

Notwithstanding repeated exposure, the most arrant nonsense continues to be talked and printed as to the Cobden treaty. It is the fashion with some to speak of that treaty as a veritable free trade arrangement, which it was very far from being. In the original treaty it was provided that no French duty on any goods mentioned in the schedules should exceed 30 per cent. This was afterwards reduced to 25 per cent., a striking instance of free trade progress in France. However, after the German war there was made the enormous national debt the excuse for an increase of duties on many articles, and the British Government, though aware that this was only in small part the real reason, was obliged to be content with it. As we have time and again said in these columns, protectionists here will gladly take what passes for free trade in France and call it protection, ample and sufficient for Canada. Or they will take what is called free trade in the United States, and hold it enough for all purposes. The case of France is a standing difficulty to free traders. Here is a country, great and enlightened, in manufactures and commerce standing next to England, in some constituents of civilisation claiming to be in advance of England, and yet utterly refusing to accept a system which the latter country has been pressing upon her acceptance for thirty years. Before free traders, either here or in England, condemn Canada for rejecting free trade let them explain to our satisfaction why it is still more sweepingly rejected by so great and so advanced a nation as France.

I fear, Sir, that I have trespassed already too much on your space; but I trust that, whatever may be your own views on the subject of one-sided free trade, you will insert this letter in your widely-circulated Journal, and invite a discussion upon a subject which concerns one of our greatest staple trades. How the people of this country can any longer expect any good outcome from the doctrines of Cobden, Bright, Gladstone, and Co. is to me—

AN EYE-OPENER.

INVESTMENTS V. GAMBLING.

SIR,—There is a responsibility in the possession of money which should be recognised by the gifted holders. Money must not be buried like the talent, which having been deposited in the earth was dug up and found the same as secreted. Some men of fortune devote all their time and energies to a betting-book, thereby showing that their native intellect requires some vent in the form of action equivalent to buying and selling in trade or commerce, and if this be one of the conditions of humanity why should not the necessity be directed to some useful purpose? A telegraph, a railway, or a mining share must do good to somebody. But a Derby, an Ascot, a Goodwood, or a Chester Cup never did any good to anybody in proportion to their evils. Some have won by betting, but the majority have lost. All the world has profited by telegraph, railways, and mines. But the world has never profited by gambling, such as horse racing, roulette, and dealings on the Stock Exchange in rotten securities as are represented by loans, bonds, and debentures of defaulting foreign states and countries. These are instanced in Greece, Honduras, Mexico, Paraguay, Peru, Venezuela, Ecuador, and Costa Rica, yet many prefer precarious and dangerous operations on the turf, Baden Baden, or the Stock Exchange to honest and honourable transactions in telegraph, railway, mining, and industrial undertakings.

It is undoubtedly the duty, as it is the privilege, of superfluous wealth to promote those classes of enterprise through which the community grows rich and the needy find bread. It is the lot of humanity that the hungry should be fed, the thirsty assuaged, and the naked clothed from the work of their hands and the sweat of their brows; therefore, the wealthy of the land have no right to squander their means in betting on horses or gambling at roulette, as the balance on settlement must, at best, be equally poised, inasmuch as what one wins another loses, while at the same time the habit and indulgence is costly, apart from the risk. It must, therefore, be clear that the Corinthian class lose on balance on horse racing. The excitement may be very enticing, and the squandering of money earned without due effort may be the habit of English gentlemen who have nothing else to do, but it would be much better for the working and industrious masses if these gentlemen, born with golden spoons in their mouths, would turn their attention and countenance to something truly useful to society, and make that their study instead of gambling. There are plenty of opportunities of investing with advantages which horse racing does not possess, and if some degree of risk is necessary to spice the occupation that, too, is offered in telegraph, railways, and in mines.

This century has given us cheap postage, steam shipping, rail locomotion, cheap literature, a free untaxed breakfast, a Suez canal, a rail communication between the Pacific and Atlantic oceans, a tunnel through the Alps, and an expansive enforced educational tenure, which in elevating the intellectual capacity of the community is certain to preserve and intensify the integral constituents of prospective prosperity and advancement. These are the fruits of peace, and a bright heritage for future generations. That telegraph and railways will become greatly extended there can be no reasonable doubt, for England must back up the Suez canal by a new railroad to India, and probably Persia and China, while the extended trade and commerce of the country must open out telegraphic communication with every quarter of the globe. Thompson says—

"The lightnings flash from pole to pole,
And louder and still louder doth the thunder roll."

But we contend that telegraphy is in its infancy, and that the commerce and wealth of England are yet in their teens, and that telegraphy, railways, and cheap literature, and postage will open up during the ensuing generation the teeming populations and wealth of China and Africa, and to the indomitable energy, industry, and pluck of Englishmen, or the English talking people of America and India must this task be entrusted and performed. There is no such thing as rest in nations more than in individual effort, therefore the Treaty of Berlin must be endorsed by practical action of capital and labour in order to foster and cement the vast advantages included in the Beaconsfield-Salisbury "peace with honour."

In respect to the advantages of home industries we may, for example, state that the Devon Great Consols, on a capital of 10241, in 23 years (1845 to 1872 inclusive) sold 567,637 tons of copper ore for 3,056,109L, and from other sources realised 94,469L; of these sums no less than 1,352,310L was expended in labour, 240,096L paid over to the Duke of Bedford for royalties, 362,970L expended in machinery, plant, and salaries, while 1,186,316L was divided amongst the proprietary as profits. In the year 1854 the profits were 6400 per cent., and the returns yielded 13,084L monthly.

Again, the Minera Mine from 1852 to 1871 inclusive sold 69,239 tons of lead ore, and 23,000 of zinc ore for 1,067,543L. Of this sum labour and royalties absorbed 600,000L, while the profits were 456,541L; the capital in this instance was 45,000L, hence the dividends since increased to 608,925L, gave in the aggregate 1358 per cent. on capital. The Van Mines situate in Montgomeryshire, the Snailbeach, Roman Gravel, and Tankerville in Shropshire, and the Lisburne Mines in Cardiganshire are the mainsprings of local prosperity. Labour and capital fructify, while the wealth arising from both combined permeates every home and hearthstone, aug-

menting trade and commerce, benefiting all from the banker to the shopkeeper, and the hardworking miner, whose energies no obstacles can daunt or cripple in his persevering progress to success. In other degrees of opulence and public advantage stand Grogwinion, Goginan, East Pant-du, Pant-y-Mawr, South Condurrow, Wheal Eliza, Wheal Peavor, West Chiverton, East Chiverton, Lead Era, Truro, Pant-y-Gwlanod. These are all refreshing enterprises, alike favourable to labour, merchants, adventurers, and investors.

Yet England alone is not benefited by mines. Australia, New Zealand, the Cape, Canada, America, Brazil, Cyprus, Spain, Mexico, and almost every other country owe their prosperity and wealth to mining, while almost every name of distinction among the aristocracy and opulent throughout the length and breadth of the land had their first start from coal, iron, slate, copper, lead, or tin mining. In California the two mines California and Consolidated Virginia, in the aggregate only 800 feet long and 60 to 300 feet wide, the enormous yield of \$100,000,000, or 20,000,000L sterling, has sprung from silver ores alone, and of which \$69,680,000, or 13,936,000L sterling, were divided as profits. Such are the results of mining, and we must again impress upon your readers that wealth carries its own responsibilities, and we may add that there is something in the condition of humanity in which self-preservation and self-gain are essential elements, and if we lay our money out most advantageously for ourselves we are instinctively, and in pursuance of a law created not by man, doing that which is best for our fellow-creatures. There are unquestionably good mines to be selected at this moment full of promise and all but established success at a tithe of their true and inherent value, and these we shall be pleased to point out to intending investors.

R. TREDINNICK,

Dealer in Stocks and Shares.

Exchange, Coleman-street, London, Aug. 13.

THE BARROW ROCK-DRILL AND ENGINEERING COMPANY.

SIR,—Kindly insert the enclosed for the information of your readers, and oblige—

LOAM AND SON.

Saltash, Aug. 15.

DOLCOATH MINE, AUG. 8.—Cost of driving by the Barrow Rock-

drill at the 314 fm. level for four weeks ending Aug. 2:—

Miners (men and boys)	£	42	0	0
Tramming stuff	10	10	0	
Explosives and detonators	43	0	0	
Candles	2	17	6	
Smith's cost and fitting	11	0	0	
Cans, oil, waste of steel, and sundries	3	0	0	

Total £112 7 6

Ground driven in four weeks, 8 fms. 4 ft. 8 in.; cost of driving, exclusive of air, 12L 16s. per fathom.

The price for driving this level by hand-labour was 26L per fm., but at this price the men did not earn 50s. per month.

LOAM AND SON.

ANTIMONY.

SIR,—The reason of its modern denomination—antimony—is usually referred to Basil Valentine, a German monk, who, as tradition relates, having thrown some of it to his hogs, observed that after purging them violently they immediately grew fat upon it. This made him think that by giving his fellow-monks a like dose they would be better for it. The experiment, however, succeeded so ill that they all died of it; and the medicine thenceforward was called antimony—(q.v.) anti-monk. There is no doubt that a spoonful of antimony (powdered) mixed with a hog's food a few days before slaughtering renders the fat firm and white, and improves the meat. A hog will also relish and live on a scuttle of clean coal, and become remarkable fat; let anyone who keep pigs try a handful a day.

C.

NOVEL FEATURE IN MINING ENTERPRISE.

SIR,—A month or two since you kindly gave me space to call attention to a novel feature in mining enterprise, the peculiarity of which is that the vendor gives the purchasers the opportunity of thoroughly testing the property offered for sale before binding them to purchase it or receiving any payment. The price to be paid is, of course, agreed on beforehand, and the purchasers, therefore, have the advantage of any discoveries that may be made during their trial term.

I am glad to inform you that we have inaugurated this plan by commencing work at a mine the vendor of which has shown his *bona fides* by allowing his property to be dealt with on the above-mentioned basis, which if generally adopted would greatly redeem the character of mining enterprise from the odium hitherto attaching to it.—*St. Clement's House, Aug. 16.*

G. J. GRAY.

THE MINERAL CORPORATION OF GREAT BRITAIN.

SIR,—I must again ask you to allow me a small space to correct Messrs. Watson Brothers' remarks in last Saturday's Journal. First, I beg to inform Messrs. Watson that the letter I sent to your office for publication on the 3rd inst. was written by myself. Secondly, I beg to tell Messrs. Watson that I had the men working on the Hafna lode in No. 4 adit long before Messrs. Watson and Lamb visited the mine; and I again say that it was on the strength of the Hafna lode that the tramroad was laid. It could not be for any other object at the time the road was laid, as all our attention was then directed to driving west towards the Hafna Mine.

Hafna Mine, Aug. 13.

WILLIAM BENNETTS.

MINERAL CORPORATION OF GREAT BRITAIN.

SIR,—In answer to the remarks of Messrs. Watson in last week's *Mining Journal*, I am instructed to say that whilst the question at issue between them and my company is in itself a trivial one, for it can be of little interest to the public to know whether a certain Capt. Roberts, of Llanrwst, did or did not apply for a situation under the Mineral Corporation, yet, as Messrs. Watson first brought the question before the public by making an erroneous statement, and this statement on the authority of Capt. Roberts has been reaffirmed in a very discourteous manner by Messrs. Watson, it becomes necessary to ask you to publish the annexed letters. From these letters it can be judged whether the statement of my company on the 29th ult., that Capt. Roberts applied for the appointment of superintendent of Hafna, in contradiction of Messrs. Watson's statement that the Mineral Corporation "tried to get" his services, is correct or not; and whether, under the circumstances, the emphatic contradiction of my company was justified. This being the only point in dispute, the introduction of the Vale of Conway negotiations appear quite irrelevant, so far as their discussion is concerned, and it is not of the slightest importance for my company to know whether at the time Capt. Roberts offered his services he was in the employ of the Vale of Conway, of the D'Eresby Mountain, or of both.

I am instructed to point out that the letter from Paris dated June 17, quoted by Messrs. Watson, must be read in connection with Captain Roberts' application of April 24. It is a matter of surprise to my company that although the letters given below were, as a matter of courtesy, shown to Messrs. Watson, they in their reply should give such an unfair impression of their contents, and should quote this letter from Paris referring to the post of superintendent of Hafna as if no previous application had been made by Capt. Roberts. Messrs. Watson, in referring to Capt. Roberts' letter of the 19th inst. say:—"Roberts wrote by return on the 19th (the letter referred to by the secretary), and said if they would kindly appoint his brother, who was a stranger in the district, and would want assistance at first; that 10L 10s. a month would be his salary, and he would render him any assistance that he might require without charging anything for himself." The actual letter which is given below states that the 10L 10s. per month for Capt. Roberts' brother as captain was to include Capt. Roberts' salary also, as superintendent, and only in the event of the brother requiring all the 10L 10s. was no extra charge to be made for assistance. But, doubtless, in any case the division of the salary would have been a family arrangement between the two. With the publication of these letters the matter is at an end so far as my com-

pany is concerned, but I may add that it was with no wish to impugn the veracity of Messrs. Watson that the denial of the Mineral Corporation was first given to their statement. It was believed that they had been misinformed.

Finch-lane, Aug. 12.

H. E. VICKERS, Secretary.

Copies of the letters referred to in the above remarks:—

THE VALE OF CONWAY LEAD MINES.

Llanrwst, British Isles, April 24.

Monsieur the BARON DE CREVECEUR.

SIR,—Having been informed that you have purchased the Hafna Mines which adjoin this, it has occurred to me that it would altogether make a splendid mining property. Some of our shareholders would sell the property clear off if it could be agreed upon to do so, and if such an arrangement could be entered into it would greatly facilitate (sic) the working of the Hafna, as you would have increased water power, and all the dressing machinery that will be required for some time to come is erected. If an arrangement of the kind could not be entered into you could obtain a large number of shares, as there are two thousand yet unissued.

Should you require a superintendent to look after your interest in the Hafna, being a practical mining engineer and continually on the spot, I might possibly serve you could we agree.

Your early reply will oblige—

JOHN ROBERTS,

Superintendent of D'Eresby Mountain Mine.

Llewellyn-terrace, Llanrwst, June 19.

SIR,—Thanks for your letter of the 19th inst.* If you will kindly appoint my brother the captain of your mine 10L 10s. per month shall include my salary and his. I do not know as yet what he will require, but if he will require the whole of that amount I will render him any assistance that he will require without charging you anything. You may depend upon him as one of the best miners in Cornwall. He has great influence over workmen, and has been captain for nearly twenty years. He has a great influence over workmen—a qualification which captains generally do not possess. You will do me a great personal favour if you will give him the appointment, and I am sure that you will have reason to be pleased. As he may not be able to get away from his present situation without some little notice, I will thank you for a reply by return.

I am, your obedient servant,

JOHN ROBERTS.

* This should be the 17th.

PANDORA MINE.

SIR,—I have had a larger interest in the above mine than any shareholder, and have been connected with it as long and, with the exception of the directors and secretary, longer than any one. I think the circular issued by Mr. Crofts to be ill-advised, and no doubt he will regret it ere long. It is quite inconsistent for a broker to undertake the duties of secretary and London manager of such an important company as Pandora. I would ask shareholders to carefully peruse the circular issued by the secretary, and would advise them if they value their interest to forward a proxy in favour of the present directors. If they have hitherto supported Mr. Crofts, and have sent their proxies to him, a new proxy will annul the old one. I trust that every shareholder will be represented at the meeting, and that confidence may be renewed in the present management. I would not be adverse to strengthening the existing board, but by no means adopt the radical measures proposed by Mr. Crofts.

ALFRED E. COOKE.

76, Old Broad-street, London, Aug. 16.

PANDORA MINING COMPANY.

SIR,—Mr. Crofts may find himself rather too fast in saying that he has got a majority of the shareholders with him. He must remember that until the last day or two only his version of things has been known; but now the directors have come out, and a more complete vindication of their conduct could not be desired. They show, besides, that Mr. Crofts has entirely misrepresented the facts. The shareholders may rest quite satisfied with the present management, both at the mine and in London; and if they study their interests they will not allow the affairs of the company to be transferred to a sharedealer's office.—*Aug. 16.*

AN OLD SHAREHOLDER.

PANDORA MINING COMPANY.

SIR,—Is it the case that Mr. Crofts, who has issued a circular to the shareholders in this company, is a market share dealer? If so, I think he is entirely disqualified from being secretary to the company, as he seems anxious to be, and I trust it will not be acceded to. Nor, I hope, will the directors be changed. They are men of business, and of the highest respectability, and we are not at all likely to derive any benefit from an alteration. It may suit Mr. Crofts to obtain an increase to his "clients," but my advice is to look after the interests of the shareholders first. If the directors are supported by the large majority, as they are likely to be, they will bring the mine into a profitable state, and the company will stand in a far better position than if it is under the control of market influences. The circular just issued by the directors completely demolishes all Mr. Crofts' allegations, and in addition exposes his own want of candour in dealing with the subject. Indeed, his pretensions are a farce. He is not entitled to the position he seeks to claim.

AN ORIGINAL SHAREHOLDER.

PANDORA LEAD MINING COMPANY.

SIR,—The circular of Mr. Crofts to the shareholders turns out to be full of misrepresentations, and a specious attempt to get the London management of an important property transferred from an office in which it has long been to his own. Being written in a plausible manner, it induced many shareholders to promise him their support, but now that a contradiction has been issued from the office many of the most influential ones have entirely altered their opinions and have withdrawn their support, promising to give their votes to the directors, who I am convinced have done the very best that could be done under the circumstances. The property is a valuable one, and I am sure its management is now in far better hands than those (of himself and his friends) to which Mr. Crofts proposes to transfer it. The position and experience of these latter are in no wise sufficient to justify them in making such a demand on the shareholders, and it would be a suicidal act for the company to accede to it. The only person who would be likely to profit by it is Mr. Crofts himself, and most people strongly object to a market sharedealer being secretary of a company.

Aug. 16.

LOOKER ON.

PANDORA LEAD MINING COMPANY.

SIR,—It would have been more satisfactory if some known experienced miner had come forward to teach us how to work a mine. The attack in last week's Journal on the Pandora directors is not only wanting in common courtesy to those gentlemen, but is not in any way calculated to inspire confidence in wavering shareholders—indeed, it looks as if the writer's connection with his "Paris friends" had turned his head. His letter would show him to know but very little about practical mining or the conducting of the affairs of a company. For instance, in his late circular to the Pandora shareholders Mr. Crofts recommends the driving of the Hafna adit into Pandora, which he believes will come in considerably under the present workings; whereas, as the directors state, the driveage would probably come out at surface before reaching Pandora shaft, and certainly would not come in so deep as the present bottom of the mine. Is this a sample of the improved mode of working which he promises the shareholders if the management is changed? Let Mr. Crofts stick to his sharedealing, and not meddle with matters which it is very evident by his letter he either does not or is not competent to understand.

Who are the parties connected with the company possessing so grand a title—Mineral Corporation of Great Britain (Limited)—about which Mr. Crofts makes such a fuss? How much cash capital have they got *bona fide* subscribed for, and have they a banking account in England? Why does Mr. Crofts refuse to give any information on these points when asked by the Pandora directors?

Surely it is necessary to know something of the standing and responsibility of the "limited" company which made so strange an offer for the unissued Pandora shares. But really it is hardly called for to continue arguing the subject of such proceedings in connection with the Pandora Company, and it is not likely that the shareholders will be so blind to their own interests as to adopt Mr. Crofts' proposals, particularly after reading the clear and convincing circular of the directors.

Aug. 15.

ON THE FORMATION OF QUARTZ.

SIR.—Those believing in the Plutonic doctrine of the formation of our earth's crust are the most difficult to convince that different elements and forces are able to combine and produce results similar to those believed as having been produced by fire. As the same theory has again been advanced at a recent meeting of the Royal Geological Society of London, I take issue with those of our English savans, who believe in this origin of mineral, and especially quartz, veins.

In a former issue of the Engineer of the Pacific I have communicated my observations on this subject, which I made in an old tunnel near Penzance, in Cornwall (England), in which aqueous solutions flowing out from the walls were forming quartz, interspersed with metallic crystals. This discovery was made 12 years ago, and from a correspondence on the subject I draw that the deposit, which is continually growing in bulk, may eventually fill the whole opening, and if discovered by future generations will, perhaps, be worked as a mineral vein.

A further proof of the formation of quartz from aqueous solutions has presented itself in a steam-boiler in use in one of the Nevada mines. A boiler of 4 ft. in diameter, and provided with five flues, had been in use for some years, but little attention had been paid to cleaning it, or blowing it off, as it is called, and a sediment accumulated until it reached the first two flues. The whole of the interior was heavily incrustated, and as it conducted too little heat the boiler had to be replaced by a new one. After cutting the former in pieces my informant, Mr. E. Watkins, M.E., found a heavy incrustation all around the inside. At the bottom of the boiler a soft sediment was found, which was overlaid by another hard crust. The flues were incrustated on top with silicate of lime, and had at the bottom a coating of solid transparent crystals of quartz; the crystals were of rhomboidal shape, about $\frac{1}{2}$ in. in length, and as perfect as any other natural quartz crystals. The formation of quartz crystals of considerable size in boiling water in but a few years leads me to the belief that the large quantities of granulated quartz which were found in early days in the burning Moscow Mine, on the Comstock Lode, were of the same origin. As quartz can be decomposed and made soluble by the action of steam, in combination with an alkali, and then used as soluble silicate, it establishes in itself the theory of its formation from aqueous solutions.

As almost all quartz veins contain sulphides, it is evident that they cannot have been formed according to the Plutonic doctrine, and extruded through other strata; for how could a combination of sulphur with other metals remain undisturbed in a melted state? Assuming even that these metallic combinations had, no matter in what form, been intruded, they could not thousands of years after appear in isolated crystalline structures, as we find them.

J. MOSHEIMER,

Civil and Mining Engineer, Practical Chemist and Metallurgist.
Montgomery-street, San Francisco, Cal., Aug. 1.

THE FIVE-WEEKS MONTH.

SIR.—I have to acknowledge your wonted kindness in admitting into your columns discussions on mining matters, and in giving to opponents the opportunity of replying to one another—or, as we say, in ventilating a subject. So much has been written about the five-weeks month, and Devon Great Consols, that if I did not know your liberality I would not presume to write to you again on the subject, which the letter in last week's Journal, signed "A Cornishman," has induced me to do, briefly. Several of your correspondents have written, it appears, under a supposition that I am an enemy to the labouring man, and an advocate for their employers. Nothing can be further from the truth. I am equally a well-wisher to both; but I contended that it was not right for men to dictate to their employers whether the month should be the calendar month or not. I grant that if a man, or any number of men, dislike the masters' terms, they have a right to leave their service, but they should not combine for the purpose of crushing their masters by terrorising those who wish to continue to work, as they have done in numerous places, in some instances to the masters' ruin, as well as to their own loss. As to Devon Great Consols, I would say to "A Cornishman," that although I have not been a labouring miner I can judge of mining matters in general just as well as those who have used the "pick and gad." In the question of strikes no practical experience is a requisite preliminary to a conclusion as to their propriety or otherwise. The folly and wickedness of the strikes have been too manifest for any sensible man to attempt to justify them, after all the poverty and misery which have been the result. The men's contention for the four-weeks month in Devon Consols, after Mr. Watson's offering to pay them twice a month, was a proof of their stubbornness. They saw that they could stop the mine by drawing away the engine drivers, &c., and they were resolved to show their power and to triumph. I confess that had the case been my own—i.e., had I been a director—I would not have yielded. I would rather have waited to see whether the threat would be carried out or not; and if carried out, I would at once have started for West Cornwall and engaged men for the posts vacated, at any price. The surrender of authority into the hands of the men was a bad precedent. I wish to see men liberally dealt with, but they should keep their places in the social system, and not act like tyrannical fools.—*Truth*, Aug. 14.

R. SYMONS.

P.S.—I regret to hear that an old and faithful servant of the Devon Consols Company—Capt. Richards—has departed this life. I suppose that the troubles arising out of recent circumstances in connection with the mine hastened his end.

R. S.

MINES OF CARDIGANSHIRE.

SIR.—Never during the past quarter of a century, nay, during this century, have the mining industries of the United Kingdom generally passed through such a period of stagnation and depression as has been now existing for some years. However much in some instances this may be due to previous inflation or to strikes, neither of these causes have affected the lead mines of Cardiganshire. We must look for the reason, therefore, elsewhere. Here are two common-sense effects which present themselves as a probable reason for the failure of any mining enterprise, the first is that the price of the produce has fallen to a figure at which it does not pay to produce it. The second is that the produce is in itself not found in sufficiently paying quantities. It is undoubtedly the fact that there has been a considerable fall in the price of lead, and I for one am of opinion that in the present state of competition from abroad we must not look for any improvement in that direction; but it strikes me, and I have an intimate knowledge of the district, that taking into consideration the unlimited water power and other facilities which Cardiganshire possesses it ought to be able to hold its own with any other lead producing district in the world, if, and this brings me to the second point, the mineral deposits do exist sufficiently rich to pay.

This will, I fear, open a wide field of discussion, but I will limit it by excluding altogether the question of purchase consideration. Merely looking at the capital expended, and the profit to be realised thereon, the price to be paid for a mine ought then to be based upon that profit. My opinion is that there is scarcely a mine in the county but what is overweighed in the matter of purchase consideration; but without discussing that let us show to the public, if we can, that the mineral deposits of Cardiganshire can be (or are) made remunerative. The mineral zone or belt extends in width from the River Dovey on the north to a considerable distance below the River Ystwyth on the south, the stratum being the Cambrian, and the mineral found almost exclusively lead, with more or less of silver intermixed with it. The lodes which traverse this area

bear chiefly east and west, or thereabouts generally, in fact, south of west, and vary in width from a few inches to many feet. They are in many places quite barren, in others richly productive, from what causes it is difficult to explain, and these conditions are subject to sudden and inexplicable changes.

The mines were known to exist and to be worked during the Roman occupation, the labour having been probably obtained on an ancient system which obviated the necessity for cost sheets, hence they were probably found highly remunerative. But coming to much more recent times it may be taken as a creditable fact that the gross produce for the last fifty years has exceeded in value five millions sterling, and as yet the average depth attained is not a fraction of that to which some of the Cornish mines have been sunk. There is no reason why the mines of Cardiganshire should not prove productive in depth, nor is there any obstacle to their being sunk; on the contrary, the water is not nearly so fast as in other mines, a 10-in lift of pumps being quite the exception. My experience of the mines of this county warrants me in saying that I think they can be made to pay. All mining is pure speculation, and there must be instances of disappointment and loss, but I think that with care in selection the lead mines of Cardiganshire are a very good mining speculation. I intend next week to give you a list of the principal mines with their capital, purchase and working returns (if any), and I trust to find that others have taken up the subject as well as—

A WORKING MINER.

MINING IN CORNWALL—"SETTING."

A correspondent of the West Briton, referring to the discussion at Wheal Pevor meeting on the subject of labour cost, says there is a matter of much importance—the system of "setting"—almost universally adopted in Cornwall, which deserves careful consideration. Setting day, at the time appointed, the captain offers a pitch to (say) Thomas Trebilcock and five partners for such a sum per fathom for one month. These five partners are selected and named by the captain, so that the "taker" has no choice, and has to do the best he can with his scratch crew, and also with the certainty that, should the "pare" earn more than 3s. per man his price will be "cut" at next setting, so that every inducement is offered to the men to work as easily as they can, and thus obtain their pittance on the easiest terms possible.

If a fair price be fixed by the captain—and he is not fit to be a captain unless he is competent to fix what is a fair price—the men ought to be rewarded for earning 4s. per month, instead of being fined, for it must be to the advantage of the adventurers to get the greatest possible amount of ground driven in a given time, for the working expenses are the same, whether much or little ground is driven. Also let the taker select his own pare, and give him a stent, either for six months or for such a length as the captain estimates ought to be driven in that time, bind him down to a minimum number of feet or fathoms per month, and then let him select both his partners and the number of them, and you have a captain in every pitch who is interested in the progress made, and who will get more work done than is now dreamt of in Cornwall. Till the present starvation system is abolished Cornish mining in hard times, such as now exist, will continue to struggle with an unnecessary weight on its back. Without substantial food the men cannot work, and upon the present wages they cannot obtain substantial food. Habit is second nature, and it will, therefore, take a long time (even after they have the means) to teach Cornish miners to eat so as to enable them to work; but when they find that foreigners, who eat, could beat them here, as they now do in the North of England (and simply from the above cause), they, too, would follow suit.

It is undoubtedly a fact also that Cornish captains are inadequately paid. In what other business in existence is such a system as that adopted in Cornish mining tolerated? Do the smelters (and they are generally supposed by miners to know which side their bread is buttered) ever dream of employing an agent amongst them, giving him here 5s. 5d. and there 7s. 7d. per month so that he may thus be enabled to earn a proper salary, but while so doing, owing to the extended sphere of his labours, not rendering to any of his employers really efficient service? A captain's post is a most arduous and responsible one, and unless he is always at his mine he cannot do his best for his employers. A man of ability, and there are many such captains in Cornwall, would not think for a moment of giving up all his appointments for the sake of one mine on the present terms; but till the Cornish adventurers are convinced that their business must be carried on on the same basis as every other business the hope of their successfully carrying on the competition with foreign mines much richer than theirs (but hampered with want of communications) is very small.

Still, I thoroughly believe that if sound commercial views are adopted and followed, that if hand labour is superseded by machinery, that if old-fashioned machinery, which did well enough in the good old easy, non-competitive times, be discarded for new-fashioned, which will do the work quicker, better, and cheaper than the old, that Cornish mining generally will flourish again; but if the "old men's" manners, customs, and methods are to be retained, then good-bye to Cornish mining, with the exception of rich or comparatively shallow mines.

Capt. White, and those associated with him at Wheal Pevor, seem to be taking the only proper and intelligent course with respect to the labour question, but the machinery question, judging from the remarks regarding the boring machine, does not seem to obtain equal consideration. It has been undoubtedly proved that with the boring machine a greater speed is obtainable than by hand labour, and in certain ground at a less cost; but assuming that no money saving per fathom can be obtained in ground worth 5s. per fathom, still the fact remains that if with the boring machine a greater speed of driving is obtainable there is a saving to the mine, because the working expenses (being the same whether 100 fms. or 200 fms. per month are driven) are less per fathom with the machine than with hand labour alone. I anticipate the objection, "We are driving now faster than we are following with the stoping, and hence we require no more ground driven." I say I anticipate this objection from the reason given for not sinking, but both these reasons seem to me to point to the fact that the working expenses are higher than necessary, because to work most economically means that every end, every shaft, every stoppe possible, should be worked, and that the surface arrangements should be placed on such a footing as to dress the utmost that can be raised. "Yes, but look at the price of tin," I hear exclaimed, "for every ton we sell now we shall lose so much when the price rises."

I think the experience gained by a certain well-known mine on stocking tin corroborates the axiom—"Always keep your manufactory (mine) at full work so long as any profit can be obtained, and when the improvement in prices come you immediately reap the benefit, whereas if you wait for the improvement before you make your alterations you will probably lose your profit altogether." For when the improvement in price comes I fear it will not last long, for so long as prices will pay for it foreign supplies will be poured in, and then down go the prices again. S. H. F. COX.

Truth, Aug. 10.

(For remainder of Original Correspondence, see to-day's Journal.)

TELEPHONES FOR MINES.—The invention of Mr. GEORGE STEPHENSON, of Newcastle-on-Tyne, has for its object improvements in electric telephones or apparatus for transmitting sounds, and has reference to telephones wherein a horse-shoe magnet is used in conjunction with a disc or plate capable of being vibrated, and hereinafter called the vibrating plate. According to this invention instead of arranging the magnets with its two poles on one side of the said disc or plate he places the disc or plate between the poles of the magnet. Between the one pole of the magnet and the corresponding surface of the vibrating disc or plate is a piece of soft iron which is surrounded by the coil; at the opposite side of the vibrating disc or plate is another piece of soft iron in the form of a tube or ring like a lining to the neck of the mouth-piece. The poles of the magnet and the two pieces of soft iron are adjustable, so that the vibrating plate may be brought into equilibrium.

Meetings of Public Companies.

ENGLISH AND AUSTRALIAN COPPER COMPANY.

The half-yearly meeting of proprietors was held at the Cannon-street Hotel, on Thursday—Mr. R. A. ROUTH in the chair.

Mr. CHARLES B. ROGERS (the secretary) read the notice calling the meeting. The statement of the six months' working to Dec. 31, 1877, showed an estimated profit of 2290l. 11s. 11d., which the directors have reason to believe will be augmented by the results of the second half-year. The reserve fund stands at 10,194l. 6s. 9d.

The CHAIRMAN said he should detain them but a short time that day. He had no resolution to move on this occasion, as it was only a *pro forma* half-yearly meeting, which preceded the meeting at the end of the year. The main feature of the report was that during the period under review the gross quantity of ore, regulus, and precipitate received from various mines was 9327 tons 1 cwt. 1 qr., as against 7615 tons 18 cwt. 2 qrs. for the corresponding six months of the previous year. The quantity of ore, regulus, and precipitate smelted at Port Adelaide and Newcastle works was 6773 tons 6 cwt. 3 qrs., as against 5904 tons 5 cwt. 1 qr. The quantity of copper made was 1221 tons 19 cwt. 3 qrs. 5 lbs., as against 1183 tons 4 cwt. 2 qrs. 17 lbs. That was the principal matter with which they had to deal, and the result of the half-year was that there was an estimated profit of 2290l. 11s. 11d., which the directors, as stated in the report, had reason to believe would be augmented by the results of the second half-year. If this was compared with the previous year, when they met here, when they had a debit balance of something over 7000l., they would see that the debit balance had been wiped out, and a profit made of 2290l. 11s. 11d. The great point, therefore, at which they had to look was that they had done as much as they could do. There was no doubt they had done a very large business, but at the same time the profit was not in proportion to the amount of business done. At any rate, they had recouped the loss made on the previous six months, and showed the company had turned the corner, and was making a profit at the present time. That, to his mind, was exceedingly satisfactory, because in the metal trade generally there had been very heavy losses, and he might say that had it not been for the very great care in purchasing, and also in the general management of the company, the directors could not have stood before the shareholders to-day, showing not only that they had wiped out the debit balance, but also added to profit a sum of over 2000l. With regard to the next six months, which was an important point to be considered, and with respect to the supply of ore, when he had the pleasure of meeting them before he told them that many mines in South Australia, from the lowness of the unit, did not think of raising any more ore. The Burra Burra Mine had stopped raising, the Moonta had limited the supply, and the New York Peninsula had reserved their output. At the same time, supplies had come forward from New Caledonia, which had more than made up for the falling off in the Burra Burra and New York Peninsula. Now, this was satisfactory, because upon this company's supplies of ore must depend the amount of business which was done, and the amount of profit made. If they were making profits which were of a fairly satisfactory character, they would be doing at the present time a large and satisfactory business. It was within the knowledge of everyone, however, that during the past two years everything had been against copper smelting, as against iron and all metals. Trade generally had been depressed. They had had the war and a great many other things to struggle with, and he need not tell them that all these things combined materially prevented these profits which they might reasonably have expected. At the present moment they had, according to the Premier, and he believed according to the general feeling of the country, great reason for believing that peace was now before them; peace was the foundation of all and everything which could be done in the mercantile world, and without peace and with agitation it was impossible for anyone to enter into large contracts. They had been assured by the Premier, and also by Lord Salisbury, that peace was now ensured, and it was the general opinion that a peace had been secured which would not only redound to their general credit as a military nation, but also to their credit as a commercial one. Therefore, with the foundations of peace assured, and also with the prospects of a good and abundant harvest, he hoped there was the foundation upon which to build a large amount of better business in this country. The markets in India had been in a state of utter stagnation, and in consequence of the war we had taken nothing from Russia. In America there had been a commercial crisis, which had scarcely ever been paralleled. It was a startling fact that no less than 5800 firms failed within six months from January to June in this year. When they saw such commercial depression in other countries they must be perfectly certain it would tell in a commercial country like England. Looking at all these circumstances, he thought they might fairly congratulate themselves on the result shown in their statement. As far as the directors could judge the supply of ore would be sufficient, and the price of copper, which on Feb. 21 of this year was 74s. 4d., and fell to 69s. 10d. in May, had now again risen to 71s. Therefore he thought they might fairly assume that they had got to the bottom of the market; and supposing they continued the same judicious purchases as had hitherto been made by the agent on the other side, he thought they might fairly hope to see at the end of the year a considerable addition to the profit which they now had to divide. The directors thought it would be better to wait till the end of the year before paying a dividend; the present amount in hand would only give about 6d. a share, and at the end of the year he hoped they would be able to declare a handsome dividend. The position of the company was sound, and the reserve fund now stood at over 10,000l., which he should be sorry to see interfered with, as it greatly strengthened the position and credit of the company. In conclusion he (the Chairman) invited the remarks that any shareholder might desire to make.

A short discussion ensued, in which Mr. Doane, Mr. Robinson, and one or two other gentlemen took part, and in reply to remarks and enquiries the CHAIRMAN said that every effort was being made to conduct the business as economically as possible. The real cause of greater profits not having been made was the low price of copper. The interest paid in Australia was less than in the previous half-year. After a few words from Mr. CORBETT, a vote of thanks having been passed to the Chairman and directors, the meeting broke up.

MELYNDWR LEAD MINING COMPANY.

The second ordinary general meeting of shareholders was held at the offices of the company, on Tuesday.

Capt. J. WALROND CLARKE in the chair.

Mr. HENRY R. MOORE (the secretary) read the notice calling the meeting.

The following is the latest report received from Mr. John Kitto, the manager:—

July 29.—In handing you my report for the general meeting of the shareholders, to be held on the 31st proximo, I beg to inform you that Bowman's new shaft, which as you are already aware is being sunk for the purpose of proving the south lode, is now down about 12 fms. from surface, and is being sunk by nine men, at 15s. per fathom. The greater part of the past month has been taken up on occupying the cutting lodge, putting in cisterns, and fixing lift of pumps in same for collecting the surface water, instead of allowing it to fall to the bottom of shaft, but this is now completed, and sinking has again been resumed, and I hope to get the shaft down to the 25 in four months from this date, where I intend to cross-cut to the lode, but as we have not been able to ascertain the exact bearing or underlie it is impossible to say for certain what distance we may have to drive to reach it, but, judging from indications, it is not far distant, and I am of opinion that from two to three months after the shaft is down will be sufficient to intersect it. We have about 8 tons of lead ore in the "bin," which is worth at present market price about 10s. per ton. The machinery is in good working condition, and the main water-wheel is now pumping and drawing from Bowman's new shaft instead of from the old shaft as formerly.—JOHN KITTO.

The CHAIRMAN said—Gentlemen, I move the adoption of the report and accounts, and in doing so I have but very little to add to the information you have already before you, both in our report and also in the annual report for our manager at the mine, Mr. J. Kitto. You will observe we have sunk about 12 fms., and it is the intention of the manager to sink altogether about 25 fms., and then he intends to make cross-cuts. The additional capital which we succeeded in obtaining has been very carefully expended, and entirely upon the development of the south lode, according to the arrangement made at the time the shares were taken. No other expenditure has been incurred from the money which was subscribed at the time. Your directors are using their utmost endeavours to bring the mine to a successful issue, and judging from what your manager says in his report of July 29 we really have hopes that we may eventually succeed in finding some ore in paying quantities. It is perfectly impossible to state very distinctly what we may find. Of course, as you know, we are working underground; at the same time, judging from the ore being in a highly mineralised condition as we go down, I think the manager is justified in looking forward to favourable results. One of the directors, Mr. Bowman, has visited the mine, and was there last May, and it will be satisfactory if he will give you the information which he gained from his personal visit.

Mr. W. BOWMAN: I shall be very glad to second the resolution. I think the Chairman had alluded to everything requiring attention in the statement of accounts. I have not been at the mine since the end of May, but I may say that a very nice shaft is being carried down, as we suppose, south of the south lode, which will not be very far from the lode at 25 fathoms in depth; but as the dip of the lode is unknown, we may have to drive a short cross-cut to intersect it. The rock we are going through is very encouraging, and highly mineralised, and spotted with lead ore. Our present pumping-wheel is quite sufficient to drain both shafts, and also to draw the stuff. The shaft is now finished to 12 fms. in depth. We are making an arrangement to catch the water above that shaft, and not allow it to come to the bottom of the shaft. On the western side the pumps will be worked from the present wheel, and the stuff drawn to surface, so we shall have but little extra expense in machinery. I have great hopes myself of the ultimate success of the sinking, partly because the north lode proves to be worthless, or nearly so, and it very seldom happens that two parallel lodes in that formation are both unproductive. (Hear, hear.) I beg to second the adoption of the report.

Mr. J. B. BROOKES thought the directors' report was, on the whole, satisfactory, and it was a pleasing feature that the directors, manager, and secretary had foregone their remuneration for a time, so that all the money subscribed on the new

shares might be expended on the development of the mine.—The report was then adopted.

Mr. BOWMAN, in answer to a SHAREHOLDER, said the only thing which could interfere with the working of the water-wheel would be a severe frost, and it was very seldom that the wheel had been stopped from that cause.

On the motion of Mr. CHAIRMAN, seconded by Mr. DAVEY, the auditor, Mr. Killingsworth, was re-elected.

On the motion of Mr. BROOKES, seconded by Mr. DAVEY, Capt. J. Walrond Clarke was re-elected, and the CHAIRMAN having acknowledged the compliment, the meeting broke up.

WEST WHEAL SETON MINING COMPANY.

A four-monthly meeting of shareholders was held at the mine on Friday, Mr. THOMAS PRYOR, the purser, presiding. There was a large attendance of proprietors, and although the prospects of the mine are somewhat cheering, yet, as a fact, a heavy loss on the four months' working had been incurred.

The CHAIRMAN believed the accounts were made up to that day, and that every item consumed during the 16 weeks had been charged. They would see by the accounts that there was an adverse balance against them of over £6000, but they must take into consideration that at the last meeting £8000 was credited for tin sold. That was a system he did not advocate, but of course it had to be deducted from this account. If it had not been for that there would only have been a balance of about £800 against the mine. Their costs had been a little heavier because during the last four months an additional axle had been erected.

Mr. HEARD wanted to know how their copper was likely to turn out for the next account?—Capt. BATH thought the copper would be about the same, but he believed there would be an increase in the tin returned.—The CHAIRMAN stated that he had had the mine inspected by an independent gentleman, who had expressed an opinion to the effect that 25 tons of tin per month might be returned.

Mr. W. H. RULE asked what were the liabilities? and the CHAIRMAN replied that the total liabilities including the present payment would be about £2000. Their position financially was a highly respectable one. Some time since they had everything on the mine valued at 10,000, or 12,000. He would have given notice of a call, but he did not like to, considering that at the last meeting they declared a dividend, but if things did not improve before their next meeting was held he should then give notice of a call.

Mr. W. H. RULE proposed that the agents' report and accounts be passed. At the last meeting they gave a dividend, for the simple reason that they had earned it. Their liabilities were something like 4000. For himself if he had it to do again he would not give a dividend as they did at the last meeting. He never saw such a black cloud hanging over the mine as now, and he had come there that day with the intention of proposing that the concern be wound up. (Laughter.) He did not believe in keeping up a mine in which they lost £800, or £1000, for 16 weeks. For the four previous months the committee were coming on the mine every day, Sundays excepted. Since their last meeting they had added 12 new stamp-heads; opened their tin ground, which, of course, added to their expenditure. At the last meeting they thought they would have returned something like 100 tons of tin, but they had only returned 72 tons. It was a very serious thing to look at the management of mines when tin was 80s. per ton—some of the mines then could not more than pay costs, and it seemed to him that they in West Seton were running in the same groove. He thought they wanted a practical man—a man with energy and youth to watch over the mine.

Mr. HEARD seconded the adoption of the accounts and agents' report. He had never seen anything about the tin leaving which Mr. Rule had entered into a contract with Capt. Josiah Thomas to take from the river below the mine.—Mr. RULE said that in December, 1876, seeing there was a large waste of tin—about 10 tons a month—he was in the habit of going to the river and taking samples. He took the leaveings on tribute of Capt. Thomas, and was to pay 7s. 6d. in 12. Mr. Rule went on to refer to statements that had appeared in print, and said he had not gained a penny by the transaction, but had, on the contrary, lost scores of pounds. He was willing to give it up to any shareholder who would take it free of cost. He thought he was working the stream in the interest of the owners. Their average was 1 ton of tin a month. He believed there was more tin going away from that mine than any mine in Cornwall.—Mr. HARVEY could not see why the managers of the mine should not work it as belonging to the mine, as well as Mr. Rule. It was open to suspicion when an adventurer took a stream belonging to the mine, and he thought it would be better if Mr. Rule would give it up.—The CHAIRMAN said he would not like it to go out to the world that they were losing 10 tons of tin per month. He knew it was not so, as would be shown by the assays in the sample book.—Mr. H. T. MAINE said they had been receiving 7s. 6d. in 12. From Mr. Rule, whereas before they lost the tin and got nothing for it. Mr. BENNETT wanted to know why Mr. Rule was so anxious to keep it if he got nothing by it. He thought it would be to Mr. Rule's interest to give it up.—Mr. RULE said his reason was because he had a large interest in West Seton Mine, and he had an impression that he worked the tin stream to protect the shareholders, by seeing that too much tin did not go down the river.—Mr. F. MITCHELL thought there was a great deal in what Mr. Rule had said. He did not think there was anything better that they could possibly do than to encourage a tributor to go below the mine and work the refuse of the mine, but they should be informed as to what his actual returns were.—The CHAIRMAN stated that the agreement between Mr. Rule and Capt. Thomas was dated September, 1876, and was to run for two years. The company had no power to take it from Mr. Rule, unless he chose to give it up.

Mr. RULE then observed that the way in which the mine had been worked in former years reflected great credit on the agents. He believed they had done their best for the adventurers, and he also believed that a great improvement could be made for the benefit of the mine. Capt. Bath had been in the mine for 25 years, and he would say a word against him, but they wanted a young and energetic man to look after the mine. He would, therefore, propose Capt. Retta, of South Crofty Mine, as a suitable man to undertake the management of the mine.—Mr. PAUL seconded this.—Captain BATH did not think it was serving him fairly. Some one would have to go on night work, and he could not stand it. They had cut a lode at the shaft, and if a new agent were to come in he would have praise for doing it.—Mr. RULE said that on no account would it alter Captain Bath's position. If Capt. Bath could not do night work all he had to do was to say so, and he could have day work.

Mr. BUDGE moved an amendment to the effect that the question be deferred to a special meeting, to be held a month hence, to consider the matter. While holding a high opinion of Capt. Retta's abilities, he considered there were many shareholders who did not know him, and he thought that in fairness to them they should be made acquainted of the fact that a change in the management was proposed.—Dr. HUTCHINSON seconded the amendment; and, although he held a high opinion of Captain Retta's abilities, yet he advocated giving the present manager another trial, more especially as he believed the shareholders would see a vast improvement in the mine by the next meeting if, as stated in the report, they had cut a new lode.—Mr. HEARD also thought a special meeting should be called, but Mr. Rule would not withdraw his proposition. Capt. Bath and Terrell had done a good deal of good for the mine, but he was of opinion that if they had an additional agent to look after the tin department it would benefit the mine.

The amendment was then put to the meeting and lost, and Mr. Rule's proposition was declared carried.—*Western Daily Mercury.*

EAST POOL MINING COMPANY.

A three-monthly meeting of shareholders was held at the mine on Monday.—Mr. R. R. BROAD, of Falmouth, presiding. The mine continues prosperous, and here the same as at several other Cornish mines the only thing that is required to make the mine a good one is a substantial rise in the price of tin. As it is the shareholders thought themselves justified in declaring a small dividend.

The following is the agent's report:—

Aug 5.—Great Lode: The engine-shaft sinking below the 180 is down about 15 fms. 4 ft., and at present we are sinking and cutting the bottom flat. The sump-winch shaft is down 2 fms. below the 190, and the bottom flat at this place is finished. We shall commence to sink this shaft as soon as possible. The 190 is driven west from the sump-winch shaft 17½ fms.; the lode is worth for tin 16s. per fathom. The 190 fm. level is driven east from the sump-winch shaft about 20 fms., and is worth for tin 18s. per fathom. In the 180 we have six stopes working, two east in the 180, and two in the 190, and are now working at 18s. per fathom each stoppe, and two east in the back, worth 12s. per fathom each stoppe. The winze sinking in the bottom of this level is down 6½ fms., and is worth for tin 12s. per fathom. In the 170, east from engine-shaft, the cross-cut driving south from the Great Lode is driven about 20 fms. This cross-cut is driving to cut the Flat Lode. The stoppe in the bottom of the 160 fathom level, on the eastern ground, is worth for tin 9s. per fathom.

Engine Lode: The 170, west from engine-shaft, driving south on the cross-course, is now south from the engine shaft 6½ fathoms; here we hope soon to cut the south lode.—Flat Lode: At the 150 we have three stopes working, worth on an average for tin 12s. per cubic fathom. We shall commence to drive the 150 end east at once.—South Lode: The 160 is driven east from the cross-cut about 45 fathoms, and is worth for tin and copper 12s. per fathom. In the 150, west from the eastern cross-course, we have two stopes working—one in the back and one in the bottom, worth for tin and copper 10s. per fathom. In the 150, east from the western cross-course, we have two stopes working in the bottom, east and west of Woolcock's winze, worth for tin and copper 14s. per fathom each stoppe. The 140, west from the eastern cross-course, is communicated with the winze sunk in the bottom of the 130. We have one stoppe in the back of this level, worth for tin and copper 10s. per fathom. The end west from this winze is worth for tin and copper 12s. per fathom.—Western Shaft: Since our last meeting we have cleared the long cross-cut at the 70, and are now securing the shaft from surface to the bottom. We have eight tribute pitches working, at tributes varying from 10s. 6d. to 13s. 4d. in 12.—J. J. MAYNARD, Manager; C. BISHOP, W. TIPPETT, Agents.

The CHAIRMAN said it was a very good statement of accounts, because it was a profitable one, and he was sure it was so gratifying to the shareholders generally as it was to him to find that with the low price of metal East Pool was able to hold her own. He had one little matter to bring before them, which was of importance. They knew very well that Mr. Martyn, the purser, came into the county of Cornwall to reside in consequence of ill-health. He had been with them for three years and had thoroughly re-established his health. That gentleman was thinking of going to Liverpool, where he had relations, to reside again. Some of the largest shareholders in the mine were very desirous that Mr. Martyn should be retained as purser of the mine. As he had recovered in health, he (the CHAIRMAN) thought Mr. Martyn should stay amongst them. Mr. Dennis, the largest shareholder in the mine, and some other gentlemen in Liverpool, wished Mr. Martyn to remain, and had given their sanction to an increase of pay to keep him in the county. He would say that if Mr. Martyn left the mine, he (the CHAIRMAN) would immediately sell his shares. He had the greatest confidence and faith in that gentleman, and he was sure that the mine would be in greater prosperity than it had ever been. The mine was paying a dividend with the present low price of tin, and had it not been for a small debt that still remained against them, they would be able to pay as good a dividend as they did when East Pool was in its zenith, and when tin was at its highest, which was 50s. per share.

Capt. ABRAHAM JAMES said with respect to the question at issue he had heard it stated that the purser's salary was to be increased because of the improvement he had made in the dressing of tin on the mine. That day he had made it his business to go on the dressing-floors to take some samples of 'whites' and silica, and if what he had heard was true he should oppose it tooth and nail. If it was a question of salary for services rendered as purser to the mine, he should offer no opposition to it. The work in Capt. Garvey's time was as efficiently done as then and with a smaller staff. He would not, however, dwell upon it inasmuch as the advance was not based upon any improvements Mr. Martyn had effected.—The CHAIRMAN observed that the purser had already carried out some improvements which so far had proved a success.—Capt. A. JAMES stated that he had not come before them, and given his opinion merely, but he was ready to give them facts. From samples he had taken that day of the 'whites,' he found that before being taken to the calciner it could be reduced at least 30 per cent., without waiving any tin. There was a very large quantity of 'whites,' and, on enquiry, he had been informed that could not be removed as they had not sufficient calcining power to treat it. If more attention were paid to the 'whites' sent to the calciner, he was of opinion that at least one-third less would never go there.

The CHAIRMAN read a paper, which showed that the amount of tin sent to the stamps between Nov. 8, 1877, and Feb. 16, 1878, was 976 tons, and the loss through dressing was 82 tons, or a percentage of 8½. During the twelve months ending May 11, 131 tons were sent to the stamps, and the waste was only 4 tons, or 3½ tons per cent., instead of 8½ as on the other occasion. That in itself he thought was sufficient to show that there was an improvement somewhere.

The CHAIRMAN said that he would see to it that a motion to the effect that Mr. Martyn's salary should be increased from 8s. 3s. to 12s. 12s. a month, and—Capt. NANCARROW said: Don't talk like that, or we might as well go home.—The CHAIRMAN was contented from his knowledge of Mr. Martyn, that although there might be men equal in calibre to that gentleman in Cornwall, yet there was not one who understood his work better. The CHAIRMAN added that if they did not acquiesce and give Mr. Martyn an increase they would lose his services, and—Capt. JAMES said if so they must have another purser. There were as good fish in the sea as had been taken out. They had got on very well before Mr. Martyn came there.

Capt. MAYNARD observed that Mr. Martyn had never interfered with him in any respect; further that the agents and purser had so far worked together. As regards the calcination of ores he thought it would be advisable to calcine the ores earlier, as he believed it would then get the ore free from the light waste. He then referred to the new magnetic machine, and stated that it was his opinion that their calciners did not admit sufficient oxygen to make the ore sufficiently magnetic. As a remedy, he suggested additional flues in the calciners, which would enable them to burn their ore in less time and effect a saving in fuel.—Capt. A. JAMES certainly did not object to the purser and agents conferring together. What he objected to was Mr. Martyn's interfering with the agents. Only recently, while at West Bassett, Mr. Martyn informed him that they were actually saving 7 tons of tin per month by the new process. He, however, learned that the 'whites' had increased to about 30 tons in consequence of insufficient calcining powers.

Mr. HARRIS proposed, and the CHAIRMAN seconded, that Mr. Martyn's salary be increased a guinea per month. The motion was put to the meeting, and the CHAIRMAN said he would only vote for the only two who held up their hands.—Capt. PAIDRAUX suggested that they should pay off the debt on the mine (70½) before increasing the salaries.—The CHAIRMAN declared the proposition carried, but some of the other shareholders wished to know whether the CHAIRMAN had put any proxies on the table before the commencement of the meeting. The CHAIRMAN said he had not, but that he had them in his pocket, and he would place them on the table, which he did. This he held was not legal, but the CHAIRMAN would have it that the motion was carried.—Mr. MARTYN said he did not want any quibbling, nor did they want to make that a bear garden just the same as at other mines.

A dividend of 2s. 6d. per share was declared. Personalities were freely indulged in during a discussion which took place. A vote of thanks to the CHAIRMAN, agents, and purser brought the meeting to a close.—*Western Daily Mercury.*

THE SCOTCH MINING SHARE MARKET—WEEKLY REPORT AND LIST OF PRICES.

During the past week the market has been quiet owing to the usual fortnightly settlement intervening, and particulars of the continuation business then done are given below. The commencement of the account for settlement, Aug. 30, has so far been attended by no very marked increase of animation, and it is apparent the season must be further advanced before much business is to be looked for. This dividend was not paid just as the week of the settlement was commencing, when it could have had effect, consequently the full effect of this influence has yet to be received. The revival in trade is necessarily very slow to become appreciable, but there can be no doubt the reports which are being received from different trades of improvement—now here and now there—will eventually lead to general cheerfulness.

In shares of iron and coal concerns there is still a very good demand for the cheaper investments. A revival in the iron trade is very confidently anticipated, and there is no trade in which an improvement would more speedily extend to and animate other departments of home industry. The annual meeting of the Mersey Steel and Iron Company is to be held to-day, and a special meeting of the Steel Company of Canada on Sept. 4. On the week of the settlement the advance of 10s. per share, also Arntson and Ebbw Vale, each 2s. 6d., but Marbella is 10s. lower, Benhar and Bolckow, Vaughan, A. each 5s., Chapel House and the debentures unaltered at last week's prices. Antrim Iron Ore A shares lower, at 38s. 6d., yielding at this price 4½ per cent., while the B shares at 35s. 6d. would give 4½ per cent. on an investment based on the two previous half-yearly dividends paid. Andrew Knowles and Sons are at 9s. 6d. Bilson and Crump Meadow, 65s. Bilbao, 24. Bolckow, Vaughan, A, 59½ to 60½; ditto preference 5 per cent., 20 ex div. Cardiff and Swansea, 22s. Charles Cammell and Co., 8½ dis.; ditto 6 per cent. debentures, 102. Chillington, 55s. to 65s. Ebbw Vale, 24. John Bagnall & Sons, 27s. 6d. John Brown and Co., 102½ dis. Marbella, 10s. 6d. Marbella (pref.), 70s. 6d. Monks, 10s. 6d. Onkla and Cleland, 12s. 6d. to 15s. Pelsall, 11½ dis. Sandwell Park, 18s. Sheppridge, 21 dis. Silstone and Dodworth, 28 dis. Staveley, C. 73; ditto, D. 13. Thorp's Gawber Hall, 40s. to 50s. West Mostyn (pref.), 1. There is very little business doing in shares of foreign copper and lead concerns. Cape are reduced 17 per share. Alamillos are at 30s. English and Australian, 25s. Linares, 5. Rio Tinto 5 per cent., 63½. Yorke Peninsula, 3s. 9d. to 5s.

Shares of home mines continue out of favour. Many of them will no doubt soon become things of the past. People as a rule understand what risks attend mining shares, and hold themselves prepared to deal with such as affect the intrinsic values of properties, but when they discover that in numerous instances the management is weak and hasty, and quite as often in unscrupulous hands, all confidence in the shares is still very low, principally no doubt on the price of lead, but since the recent improvement has raised the expectations that the mine will still do as well as has from time to time been held forth, some advance seems warranted. The shareholders of South de Eresby will probably be expecting to hear further about the value of the splendid lode in that property. The 12 per cent. debentures of the Montrose Slate Quarries Company are being offered at par. The next sale of the Glasgow Caradon Copper Company is computed 205 tons, to take place on Aug. 24. This will compare with 200 tons last month, while in the month of August for the last three or four years the sales have always ranged from 255 to 250 tons. Leadhill shares are lower, so it is probable, no dividend is to be looked for next month. Aberdunant are at 6s. 3d. Bampfylde, 5s. Bedford United, 4s. Carn Brea, 34½. Cargill, 6s. Combarnit, 5s. Cook's Kitchen, 15s. Dolcoath, 26s. Devon Consols, 45s. East Caradon, 6s. 3d. Gawton, 6s. 3d. Gunnislake (Clitters), 15s. Herodford, 75s. Hington, 5s. Marke Valley, 15s. Melanear, 15s. Parys Mountain, 3s. Penrith, 6s. Rookhope, 12s. 6d. to 17s. South Caradon, 65s. South Condurow, 11½ ex div. Tankerville, 75s. Tincroft, 8. West Chiverton, 7½. West Wharfedale, 60s. West Seton, 8½. West Tolgus, 52½. West Tankerville (pref.), 15s. Wheal Crebor, 12s. 6d. Wheal Pevor, 6 ex div. Wheal Uney, 15s.

In shares of gold and silver mines, Richmonds mark a further fall of 12s. 6d. being, perhaps, the lowest of the week's runs. In June Chantales crushed 990 tons of ore, while Javay crushed 1800 tons at a profit of 7s. The loss of July of St. John del Rey has been 35,000 oits., 13,622; while that of Don Pedro has been 1750 oits. Almadras are at 5s. Birdseye Creek, 13s. 9d. Cedar Creek, 2s. 6d. to 3s. Colorado United, 80s. Don Pedro, 9s. Eberhardt, 4½. Emma, 2s. 6d. Exchequer, 1s. to 3s. Flagstaff, 11s. 3d. Frontino, 35s. Gold Run, 6s. Javali, 8s. 9d. Pestarena United, 4s. 6d. South Aurora, 2s. 6d. to 5s. Tecoma, 2s. 6d. to 5s. United Mexican, 75s. In shares of oil companies, Young's Paraffin being scarce at the settlement have advanced 5s., but Uphall are 3s. 9d. lower. There has been more doing in shares of miscellaneous companies, but prices are unaltered. A call of 1s. per share has been made on Avonide Engine Shares. Milner's Safe are at 9. New Sombrore Phosphate, 11. Native Guano, 80s. Palmer's Shipbuilding, B. 11 dis. Phosphate Guano, 9. Val de Travers Asphalt, 4½. Wagon companies shares are weak. The report of the Gloucester Company, to be submitted to the meeting on Aug. 27, for the year ended June 30 last shows the profits will not admit of the payment of any further dividend, consequently the interim of 2 per cent. paid in March is all the shareholders will get this year. The Midland Company has declared 10 per cent. for the half-year. At the half-yearly meeting of the Bristol and South Wales Company a dividend was declared at 10 per cent., with a bonus of 2 per cent., payable Aug. 20. The meeting of the Metropolitan Railway Carriage and Wagon Company is to be held this afternoon, when a dividend of 10 per cent. per annum, less the interim dividend, will be declared, and the Railway Rolling Stock Company is to pay 5 per cent. for the half-year. Birmingham shares are at 16½. Gloucester, 7½ to 8. Metropolitan, 70s. prem. Midland, 16. Railway Carriage, 97s. 6d. Union Rolling Stock, 30s. prem. United States Rolling Stock, 13½ to 13½ ex div. Shares of chemical companies are firm. Langdale's at 87s. 6d. to 90s., Lawes' 8½, and Newcastle 41s. 3d.

HUNTINGTON COPPER AND SULPHUR COMPANY (Limited).—There is apparently an impression that it is to the effort which was made at the late general meeting of this company to influence opinion in favour of the original promoters that Capt. Warne's report on the mine, of which an abstract was given last week, is due. It will, therefore, be useful to allude to some remarks which have appeared in a Canadian newspaper putting the concern in a different light entirely from the description Capt. Warne gave of it, which description it need scarcely be said took people on this side somewhat by surprise, so different was it from the general impression. These remarks complain of statements made by the promoters pretending that things could be seen on the surface of the earth which never were there, of alleged facts bearing upon the previous product, the works constructed, the ore taken out awaiting shipment, which were not facts. Captain Warne's report they dissect, showing from their point of view its palpable deception and arrant rot. Of course, people on this side will say what is the use of this now, the time to warn us of the swindle being perpetrated was before we parted with our money. They caution the shareholders that to spend money on further exploration is simply another raid on the innocent investor's pockets. The caution is, perhaps, needless, but the fact is, the mine is a dire and a dire one, and it is not to be used as a guinea pig for the promoters is not new at all; it is, in fact, so stale as to surely defeat its purpose. The actual results, when worked under the most favourable conditions, and the celebrated process of Mr. Henderson, are what the concern must be judged by, and not by Capt. Warne's statements as to what might have been or will be the results of further working. Capt. Warne, who it appears is not well known

in Canada, though he has been selected to give this important report, says the mine is a good one, and everybody sees it has been good for nothing. Afterwards he describes it as being as good as ever it was, and with this those who think it is a valuable property equally with those who perceive it is a swindle can agree.

On contingency (Monday) the following were the rates of continuation current:—Contango: 8d. on Benhar Coal; 1d. on Glasgow Caradon; 1d. on Glasgow Port Washington; 1d. on Huntington; 2½d. on Marbella; 1½d. on Monksland; 1s. on Richmond.—Backwardations: 3d., 6d. on Tharsis; 9d., 6d. on Uphall Oil; 9d., 10½d., 1s., 1s. 6d. on Young's Paraffin. On comparing the making-up prices fixed to-day for the undermentioned shares with those of the previous settlement, the changes thus shown to have occurred during the account are:—Monksland, also Omoo and Cleland, have each advanced 2s. 6d. per share; Richmond have fallen 1½. 3d. per share; Uphall, 11s. 3d.; Benhar and Young's Paraffin each 7s. 6d.; Tharsis, 6s. 3d.; Huntington and Marbella each 2s. 6d. The following show no alteration:—Canadian Copper, Glasgow Caradon, Glasgow Port Washington, Oakbank Oil, Rio Tinto, and Tharsis (new).

Subjoined are this week's quotations, &c., of mining and metal shares quoted on the Scotch Stock Exchanges:—

Per share.	Paid up.	Rate per cent.	Description of shares.	Last price.
£ 10	£ 8	£ 7	£ 7	
100	10	4	4	Arntson Coal (Limited) .. 7½
100	10	22s. 6d.	22s. 6d.	Benhar Coal (Limited) .. 59½
10	10	10	10	Bolckow, Vaughan, and Co. (Lim.) .. 5
10	10	10	10	Cairntrill Gas Coal (Limited) .. 60s.
10	10	10	10	Chillington Iron (Limited) .. 7
23	20	10s. 10d.	10s. 10d.	Clyde Coal (Limited) .. 9½
10	10	nil	nil	Ebbw Vale Steel, Iron, and Coal (Lim.) .. 70s.
10	10	nil	nil	Fife Coal (Limited) .. 50s.
10	10	nil	nil	Glasgow Port Washington Iron & Coal (L) .. 50s.
10	10	nil	nil	Lochore and Capleirae (Limited) .. 50s.
10	10	nil	nil	Marbella Iron Ore (Limited) .. 50s.
10	10	nil	nil	Monksland Iron and Coal (Limited) .. 52s. 6d.
100	100	nil	nil	Nant-y-Glo & Blaenau Ironworks pref. (L) .. 70s.
6	6	6	6	Omoo and Cleland Iron & Coal (L. & Red.) .. 12s. 6d.
1	1	15	15	Scottish Australian Mining (Limited) .. 37s. 6d.
1	10s.	15	15	Ditto New .. 15s.
Stock	100	nil	nil	Shotts Iron .. 91
COPPER, SULPHUR, TIN.				
4	4	4	4	Canadian Copper and Sulphur (Lim.) .. 5s.
1	1	7½	7½	Cape Copper (Limited) .. 30½
1	1	15s.	15s.	Glasgow Caradon Copper Mining (Lim.) .. 25s.
1	1	9½	9½	Ditto .. 20s.
4	4	4	4	Huntington Copper and Sulphur (Lim.) .. 20s.
10	10	6	6	Paraullico Copper (Limited) .. 85s.
200	200	7	7	Ditto, 7 per cent. Mortgage Bonds .. 15
100	100	5	5	Do. 5 p.c. Mor. Deb. (Sp. Con. Bds.) .. 15
10	10	22½	22½	Tharsis Copper and Sulphur (Limited) .. 24½
10	10	22½	22½	Ditto New .. 17
1	1	1	1	Yorke Peninsula Mining (Limited) .. 5s.
1	1	1	1	Ditto, 15 per cent. Guaranteed Pref. .. 20s.
GOLD, SILVER.				
1	1	1	1	Australian Mines Investment (Limited) .. 8s.
5	5	7s. 6d.	7s. 6d.	Richmond Mining (Limited) .. 5½
OIL.				
10	7	6	15	Dalmeny Oil (Limited) .. 8
1	1	7½	25	Oakbank Oil (Limited) .. 42s. 6d.
1	5s.	1	25	Ditto .. 12s.
10	10	7½	2	Uphall Mineral Oil (Limited) "A" .. 8½
10	10	10	10	Ditto "B" Deferred .. 10
10	10	10	10	West Calder Oil (Limited) .. 15s.
10	8½	17½	17½	Young's Paraffin Light & Mineral Oil (L) .. 15s.
MISCELLANEOUS.				
50	25	5	6	London and Glasgow Engineering & Iron Shipbuilding (Limited) .. 24
7	7	15	10	Phospho Guano (Limited) .. 101 15s. 9
10	10	6	6	Scottish Wagon (Limited) .. 80s.
10	4	6	6	Ditto New .. 1 per share.

NOTE.—The above lists of mines and auxiliary associations are as full as can be ascertained, Scotch companies only being inserted, or those in which Scotch investors are interested. In the event of any being omitted, and parties desiring a quotation for them and such information as can be ascertained from time to time to be inserted in these lists, they will be good enough to communicate the name of the company, with any other particulars as full as possible.

J. GRANT MACLEAN, Stock and Share Broker.
Post Office Buildings, Stirling, August 15.

THE WILD DUCK, OR SPORTSMAN'S ARMS.

"Now we are met again, I want to know," says Jan Jewell, "how a ended about the 'Pig Priar'?" "Well, you see," says Uncle Henry, "when Jolly Tom found the squire and all the company laffing ready to bust, he began to smell a rat, and a few days afterwards he went to— Mine determined to know the truth. When he got to the count-house he found the manager and purser, and several more; so after taking a glass of wine, Jolly Tom said—I didn't think Capt.—you would serve an old friend such a trick." Capt. J.—appeared quite at a loss to know what he meant. "Is it, says the purser, 'about the priar, &c., from the western mine?' To be sure it is," says Jolly Tom, "and I'm told it's not priar at all, but fat pork." But after a little while Mr. D.—persuaded Jolly Tom that it was a rare specimen of priar, and before parting they were all good friends again, and accepted Jolly Tom's invitation to go down next week to sample his 'old port.' "I must now tell ee men," says Uncle Henry, "that when the wheel was put up at Wheal Crofty, Jolly Tom at every owners' account would insist upon it that the wheel was in the wrong place, and that some day the wheel and everything else would run away in the old workings, and he told the story so often that he believed it. Well, on the day fixed the invited party went to Jolly Tom's to sample the wine, which was pronounced to be splendid, and just as all hands got very comfortable, the servant came to say that the timberman must speak to Capt. J.—at once. 'Tell him to come in,' says Jolly Tom. So in came the timberman like a man frightened out of his wits, and the water running out of his clothes. It was a flood of rain. 'What's the matter,' says Capt. J.—, and as soon as the man could speak, 'a terrible thing,' he said. 'Take a glass of grog, my poor fellow,' says Jolly Tom. At last it came out that Wheal Crofty wheel, rods, bobs, and wheel-pit had disappeared for ever. 'By G—,' says Jolly Tom, 'how often did I tell you so, and you wouldn't believe me,' and after a few more oaths both loud and deep, Jolly Tom jumped up and ran like a madman, without hat or stick, in a pelting flood and storm to see the wreck at Wheal Crofty. He arrived there quite out of breath, and found the wheel working in first rate style. As soon as he was able to speak the first word was 'D—that sergeant, wait till I catch him.' The timberman was always known as Serjt. W.—, a shrewd clever fellow. The party after finishing a bottle of wine, thought it would be best to retreat by way of the garden before Jolly Tom returned. At last he came back wet to the skin, and to the astonishment of everybody, never opened his lips again about Wheal Crofty wheel. And after getting dry clothes and some stiff toddy, he went to bed like a sensible man. "I can mind Tuckingmill," says Old Tom, "many years ago; old Mr. B.—I, used to have a fine shop there. He was a loving old man, and used to say 'my dear' to everything, and if he was going to knock a man down he would say, 'I'll knock ee down, my dear.' Well Uncle Will R.—g went down there one day to buy a suit of clothes for Sunday's; but just as he was going home it came to a regular flood of rain. 'I don't know what to do,' says Uncle Will; 'you shall have my umbrella, my dear,' says Mr. B.—I. 'Oh,' says Uncle Will, 'I could never manage such a machine as that.' 'But stop, my dear,' says Mr. B.—I, 'I will show the way to open and shut.' So after a good deal of practice, Uncle Will said 'he knewed to manage her,' and away he went, and all the way going home there wasn't a prouder man in the parish. 'I've heard,' says Uncle Will 'about the umbrella before, and that 'twas all pride to car such things. But don't tell me, she's the finest thing that ever was invented, for here am I in all this flood as dry as a bone. I'll have one of my own next time I go to Tuckingmill.' At last Uncle Will got home to his own door, and began to sing out to the old 'oman to 'come and see what a beautiful machine he'd got.' Moly looked out and said—'I would rather be in from such a flood of rain than out there.' 'Oh,' says Uncle Will, 'she'll keep me dry as a bone.' 'Well,' says Moly, 'are ee coming in Willey, or are ee going to stay there

never be so mazed as to try her again.' Old Capt. C—— touched the spring, and she closed in a minnit. 'Take her away,' says Uncle Will, 'she's bewitched.'—From Cousin Jack's Unpublished M.SS.

IMPROVED OSCILLATING PUMP.

A peculiar kind of oscillating pump, claimed to be of extraordinary forcing power, of extreme simplicity and cheapness of construction, and applicable as a mine pump, has been patented by Mr. Karl P. Volkmar, of Williamsport, Pennsylvania. It consists essentially of a scroll plunger combined with a central disc, which constitutes an oscillating plunger, the said parts being operated by an eccentric and driving shaft working concentrically within the shell or casing of the pump. The disc divides the cylinder of the pump into two parts by forming a transverse mid-division, two sets of inlet and outlet ports being situated one in each of the two chambers of the pump.

The shell of the pump is cast in two cylindrical pieces joined in the middle transversely by enlarged parts or flanges, within which enlarged parts is formed a circular chamber for the before-mentioned disc or oscillating plunger to work in. On the inner face of each head of the casing there is cast a cylindrical portion, projecting inwards as far as the disc, and in combination with these cylindrical portions there are partitions which separate the inlet from the outlet port of each set, and project inwardly to the inner ends of the said cylindrical portions. These partitions enter slots made for their reception on diametrically opposite sides of the before-mentioned scroll plunger. The motion of the scroll plunger is controlled by two or more guiding discs situated in the sides of the central enlarged chamber, there being studs or pins on the sides of the central disc or oscillating plunger near its periphery, which engage into corresponding holes in the said guiding discs. The actuating eccentric or cam hereinbefore referred to is slotted radially on one side, so as to fit a squared and lateral projecting portion or crank on the driving shaft, a helical or other spring being interposed between the end of the said crank and the inner end of the slot in the eccentric, which allows the eccentric a limited play or movement on the squared portion or crank of the driving shaft. The two suction or inlet pipes may or may not be united at any desired point, and have thus a single pipe through which the water will be drawn, and it is also preferred to unite in like manner the two outlet pipes.

The suction pipe being connected with the water supply, and the shaft rotated in the proper direction, the water will be drawn in through the two opposite inlet ports, and expelled through the two opposite outlet ports, since by the peculiar oscillating motion of the scroll plunger there will be a constant suction at the inlet ports alternating within and on the outside of such plunger, and at the same time a constant forcing of the water at the outlet ports, this pressure being exerted alternately by the contraction of the space within the plunger and that between such plunger and the shell of the pump. No air chamber is required with this pump.

MECHANICAL ORE CONCENTRATION AND SEPARATION.

No. I.

The question of the preparation of ore for market being one in which miners generally are deeply interested, it is proposed to give from week to week in the columns of the *Mining Journal* an abstract of an elaborate work* on the subject now preparing for publication by Mr. F. M. F. CAZIN, M.E., of Bernalillo, New Mexico, the use of the manuscript of which has been liberally offered by the author, who has had considerable experience in American mines, and has collected a mass of facts which, in new mining districts like those of the Pacific Coast will be invaluable, and will at the same time afford valuable suggestions to those entrusted with the management of mines in other new countries, although the natural conditions may be somewhat different. The author's object is to supply reliable information as to the principles involved and the nature of the mechanical arrangements adopted in the machinery and apparatus more extensively employed, and which have proved the most successful in the Pacific States, and this object he seems to have thoroughly attained. He states that as early as 1812 Schroll wrote a treatise, "Contribution to the Art and Science of Mineral Dressing," and that since then at short intervals Stiff, Karsten, Villafosse, Russeger, Rittenger, Gatschmann, and Küstel have written books on the subject. The British tin mining industry could not exist without mechanical dressing, and as evidence of the utility of that art he mentions that the Merterist Company in Rhenish Prussia successfully treats mineral carrying only 1.80 per cent. of lead, and from 1.6 to 3.6 oz. of silver per ton of ore, or 186 grammes of silver per ton of lead. The practicability, or otherwise, of treating such low-produce ore depends upon the character of the matrix with which it is associated. The company mentioned obtains its profit by treating 1,500,000 tons of ore per annum. It is intended that the treatise shall enable adventurers to judge whether their ores can be dressed or not, and at what cost. He divides metallurgy into mechanical and chemical, and subdivides the latter into dry processes, embracing roasting, smelting, &c.; and wet processes, which include amalgamation, precipitation, and so on.

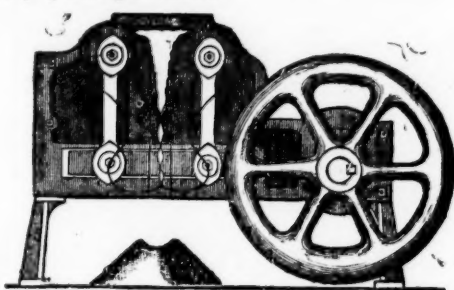
Under the name of mechanical metallurgy Mr. Cazin includes concentration and separation, and he states that concentration is the increasing of the percentage of valuable particles, while separation is the dividing into valuable particles of one or of different nature, and into particles of waste material. Mechanical metallurgy is also called the art of mineral dressing, and as long as two different particles of minerals differ in their specific gravity they can be separated by the art of mineral dressing. Mr. Cazin next treats of specific gravity, and shows that the facility of separation is in accordance with the greater or less difference in the specific gravity of the mineral and the gangue. He shows, also, that ores altered by weathering or otherwise are frequently more difficult to deal with. With regard to the financial importance of mineral dressing, he says that a correct appreciation of what mechanical concentration can accomplish with the ore of any mine, whether the mine produce high or low grade ore, should precede all and every decision concerning the disposition to be made of the ore, and concerning any kind of works to be erected for its treatment. With the assistance of mechanical concentration mines possessing a solid body of low-grade ore fit for such concentration produce frequently better financial results in length of time than mines producing very high grades spasmodically. Reduction works may be of assistance of mechanical mineral dressing be provided with ore of higher value, and continued easier treatment and their capacity thereby multiplied.

The specific gravity of a mineral Mr. Cazin defines to be the weight of one unit of volume compared with the same unit of volume of some other substance taken as a standard. He suggests as the simplest method of ascertaining the specific gravity of a mineral to weigh a known quantity of such mineral in air. Then have a narrow-necked glass vessel holding a known weight of distilled water between two marks on the neck. Let the water stand level with the lowest. Drop in portions of the weighed mineral to sink the bottle to the other mark. Weigh the unused dry powder to ascertain how much has been used. Divide the weight of the powder submerged by the weight of the water which would fill between the two marks and the quotient will be the specific gravity. An elaborate table of specific gravities of minerals is then given. He states that experience has shown that particles of equal size but of unequal density when allowed to drop from the surface of a liquid of still less density will arrive the one of higher density sooner at the bottom than the one of lower density, and their falling through an upward moving stream of water assists the separation. Practice has up to this time proved that water is more effective than air for separating minerals, but he thinks the art will probably be extended both ways. Referring to breaking and sizing Mr. Cazin has some excellent remarks. Amongst these he observes that too much attention cannot be given to picking out all hand

pieces of poor ore, as every ton of poor ore thus thrown out is so much saved in transportation and future handling; and he adds that with close adherence to correct principles it has been practically proved that even rock from rock, as fluor spar from calcareous spar, where the difference in density is only 0.3 to 0.5, can be successfully separated upon the regular working scale.

The question of how fine ore should be broken for the purpose of dressing can never, Mr. Cazin says, be considered a general one, but must be determined by the nature of the ore; for example, it would serve no practical purpose to break into the size of a pea or bean ores carrying the metallic part disseminated very finely in the rock, as gold in quartz, or cassiterite in tinstone. In these cases dependence must be placed on the experience of the dresser. But it is desirable to work each ore as large as practicable (considering its nature) as the expense of crushing too fine will be saved, and the larger particles are more conveniently manipulated. When once the size is determined upon the selection of machinery is a matter of experience. The breaking machinery may be distinguished according as it is adapted to break into coarse, middle, and fine sizes, and will embrace crushers, rollers or grinders, and stamps or pulverisers. The invention of the jaw crusher, by Mr. E. W. Blake, of Newhaven, Conn., constitutes one of the most remarkable steps of progress in the art of mineral crushing, because it admits of the profitable treatment of many kinds of ore which, were hand treatment only available, would have to be thrown aside as worthless. These machines are already quite familiar to the readers of the *Mining Journal*, especially in the most approved forms manufactured in this country by one of Mr. Blake's partners, Mr. H. R. Marsden, of Leeds, and to which Mr. Cazin specially refers.

Modifications have been made in the application of the jaw principle, of which some were merely the result of attempts to avoid the inventor's privilege, and others real improvements in special directions for special purposes, and among the latter kind Mr. Cazin considers that the Alden crusher and pulveriser deserves special attention. It will be observed from the subjoined diagram that the two convergent jaws can swing to and fro while yoked together at the bottom, so as to crush and grind continuously at both forward and backward stroke, which is an important improvement upon all alternately operating machines.



Before crushers were introduced rollers and hand spalling were in use, and rollers have lost none of their previous value, though they are now used only as supplementary machines. Comparing Dodge's and Blake's machine Mr. Cazin explains that in Dodge's machine the pivot point is on the lower end of the movable jaw and in Blake's it is on the upper end. Therefrom it results that with Dodge's crusher the size passing between the jaws and out may be closely regulated, the width of outlet remaining permanent, while with Blake's machine the outlet varying in width the resulting size varies largely. But another result of such difference in construction consists in a larger quantity being worked by Blake's machine than by Dodge's, all other circumstances being equal; yet for works handling only moderate quantities Dodge's machine is well adapted and economical.

DYNAMO-AND MAGNETO-ELECTRIC MACHINES.

In all existing dynamo-electric machines it is necessary in order to render the currents uniform in direction to employ commutators, or collectors, which require frequent regulation, as owing to the constant friction to which they are subjected they sooner or later become worn to such an extent that the currents no longer pass properly. The object of the invention of Messrs. LONTIN and Co., of Paris, is to produce currents naturally uniform in direction without the use of collectors or commutators. Dynamo-electric machines require to be variously modified in construction according to the work to be performed, and as this machine is capable of the numerous modifications that may be required, it will suffice to describe the principle only. If a magnet or electro-magnet be made to move parallel with a bar of iron, upon which are placed several small coils arranged as for induction a current will be produced in each coil, which, although of variable intensity in each coil, will, nevertheless, have the same direction. If the ends of the bar be brought together so as to form a ring, the coils thus placed will always produce a current in the same direction during the passage parallel thereto of a magnet or electro-magnet. This being established, it follows that as many magnets or electro-magnets may be so arranged as the size of the ring will allow, the magnetic poles by which the ring is influenced being of course similar. If now one or more such rings, either dependent on or independent of each other, according to circumstances, be made to turn in front of a number of similar magnetic poles, each of the coils upon the ring or rings will produce a current always in the same direction, so that by connecting the poles of these small coils with friction rings upon the rotating shaft currents naturally invariable in direction may be collected and employed, as in other dynamo-electric machines, wholly or in part, for exciting the primary electro-magnets.

By employing permanent instead of electro-magnets for primary magnets the machine will be magneto-electric, so that commutators, collectors, or other means of rendering the currents uniform in direction are entirely dispensed with. The ring may be of any suitable form, provided that it can receive regular rotary motion; for example, it may be a tube, a torus, or a polygon. The number of the primary magnets is entirely optional. The ring may also be composed of a series of coils, attached one after the other in a circular or polygonal form. The entire independence of each of the coils and of their core will in certain cases permit of a simpler construction, for example a single coil may be made to cover the entire ring. The primary magnets may be placed either laterally inside or outside of the ring, or be made more or less to envelope the surface of the ring. As in practice it is advantageous to employ both poles of the magnets, it is only necessary for this purpose to use two rings influenced by opposite poles, all those for each ring being similar.

In order that the working of the machine may be thoroughly understood, it will be of advantage to explain briefly the laws which govern its action.—1. When a coil approaches the pole of a magnet a current is induced in the coil in the opposite direction to that of the magnet (a magnet being considered as a solenoid according to Ampère's theory).—2. When the coil is removed from the same pole a current is induced in the inverse direction to the former one.—3. If the coil on being removed be completely turned end for end, so as to present its opposite end to the pole, the current will be in the same direction as the former one. These three laws may be supplemented by the three converse laws without, however, affecting the result. As an example of the practical application of these laws, forming the basis of the present invention, suppose a coil to be rotated between two similar magnetic poles, the coil being tangential to its circle of rotation, and let the two ends of the coil be distinguished by the letters *x*, *y*. When the end, *x*, approaches one of the magnetic poles an inverse current is induced in the coil, and when the coil recedes from the said pole a direct current would be produced; but as the opposite end, *y*, of the coil is now presented to the pole the current will still be inverse, as when approaching the pole. The coil continuing to rotate presents its end, *x*, to the other magnetic pole (which is similar to the former one) and the same

effect is produced—i.e., an inverse current is produced; and on the coil receding from the second pole the current (which would be direct did the coil not present its opposite end to the pole) is again inverse. Thus the circular motion of a coil between two similar poles produces four currents, all in the same direction, and therein lies the fundamental principle of the invention, which obviates the use of any commutators or collectors in dynamo-electric and magneto-electric machines.

The theory of uniform currents induced by magnetisation is not new, but no attempt has yet been made to apply it practically to the production of dynamo-electricity. What was, therefore, required was to find a combination of parts applicable to the construction of dynamo-electric machines susceptible of being usefully employed for all the purposes for which electricity is available. This new system of machine, like all the Lontin machines, may be arranged for tension or quantity according to requirements.

PNEUMATIC SYSTEM OF HOISTING IN MINES.

The application of the pneumatic system for hoisting in mines would seem bold at first sight, and yet it is now a practical success, and it promises to become, says the *Revue Universelle*, the hoisting system of the future for at least all raising from a great depth. The idea of applying compressed or rarified air for hoisting the cars from a mine in a closed tube by means of a piston is old. In 1864 it was proposed by a Russian, Professor Maurer, but the credit of having first tried this method of extraction, and of having assured its success by the care exercised in all details of construction, is due to the Epinac Mining Company and to its chief engineer M. Blanchet. For depths of 1200 to 1600 feet cables and hoisting machines suffice for a large output, but as the mines become deeper the difficulty increases; the dimensions which must be given to the machines and the ropes become enormous, and the number of trips made by every cage in 24 hours decreases rapidly. The velocity which may be given to a piston in a tube is by far greater than any speed which can possibly be acquired by rope without peril. The main point, however, is that in the pneumatic system the dead weight remains constant, whatever may be the depth reached. If two connected tubes are used instead of a single one the dead weight is entirely done away with, as the pistons and cages balance one another, supported as they are by a column of air weighing almost nothing, instead of being suspended from a rope which is heavy and cumbersome, and is exposed to a break at any moment.

The elasticity of atmospheric propulsion seems a guarantee against any accidents. The only fault of the Epinac plant is its deficiency in motive power, as the machine can only exhaust 36 cubic feet per minute. A more powerful machine is now building, which will do at least ten times as much, and reduce to two minutes the time required for the ascension of a car from a depth of 2000 feet. As it is working now the system has furnished an output three times greater than that which the same motor, working with ropes in the ordinary manner, could yield.

Hoisting by means of a pneumatic tube calls for a plant composed of three principal parts—the machine for exhausting the air above the piston, the pipe passing through the whole shaft, and the piston which carries the cars.

At the Hottinguer shaft, near Epinac, the tube is composed of 674 rings of sheet-iron and 18 special cast-iron rings which are destined to receive the accessory apparatus. The diameter of the tube is 5½ feet, one ordinary ring weighing about 1100 lbs. Each one is made of one sheet, the edges being riveted together with the inside heads countersunk. The horizontal joints are made by means of angle iron ¼ inches wide and ½ inches thick, the outside rivets of which are also countersunk. This angle iron, therefore, forms flanges, which are connected by 60 bolts. A rubber ring is placed between two joints, thus making the tube air-tight and permitting at the same time some play for variations of temperature. The door rings are 56 inches thick, and are furnished at opposite sides with doors which allow the cars to go in or out. They have a vertical sliding motion. The valve rings are very similar to the sliding sluice valves of gas mains.

The tube is placed against the timber of the shaft; it is furnished with various accessory attachments, brackets, cocks, working and equilibrium pipe, barometers and safety-valves. The safety-valve pipe starts from the lower part of the tube and leads to the open air where a valve is attached which may be closed at will. With its aid the speed of the piston in rising or descending may be regulated. The upper piston carries the cage which holds the car, there being time at Epinac; below the cage there is another piston which is called the lower piston. The upper piston is double, the two parts which compose it being so far apart from one another that the distance exceeds the height of the doors. The lower piston has a valve which is opened when the car carries passengers. At the charging and discharging stations the full cars are placed or taken off in three movements, which are effected in the most simple manner by opening or closing the admission or escape valves of the air.

The pneumatic system has been working at the Hottinguer pit for 18 months without any injury to the tube or to the cages, and without any repairs. Besides a saving in fuel, the system possesses the advantage of leaving the shaft open for inspection, repair, &c. The disadvantages connected with ropes, the danger of their uses and the expense of their frequent renewal disappear entirely. The ventilation of the mine is also increased, and the hoisting apparatus may be made a valuable adjunct of the ventilators when a strong barometric depression makes the danger of fire-damp greater than usual.

—Iron Age (New York).

DANGEROUS FREAK OF A COLLIER.—At Wigan, Thomas Lloyd was summoned for a breach of the colliery rules by descending the shaft of the Queen Pit, Pemberton, belonging to Messrs. J. Blundell and Son, by means of the rope.—Mr. Taylor, who prosecuted on behalf of the mine proprietors, said that defendant, who was employed underground, instead of adopting the usual means of descent, chose the extraordinary one of sliding down the rope. The depth of the shaft descended was 60 yards.—Defendant said he went down the rope because he was "starved," having waited for the banksman one hour and twenty minutes.—The Rev. H. St. George said the Bench had decided to let the defendant off on payment of costs, and they hoped he would not repeat such an offence.—Defendant: I have done it before, and I have been sent down more than once, not at this pit, but at the 4 ft. mine at the King Pit.—Mr. Taylor: I should like in the interests of the proprietors that this should be proved.—In answer to the Bench, defendant said he had seen many men sliding down the rope.—Mr. Taylor: I think it very unlikely that this would take place.

SAFETY-LAMPS.—With a view to render the exposure of the flame impossible Mr. R. MORTON, of Wishaw, proposed to use a short central tube which is carried upon a bridge piece or otherwise conveniently supported at the interior of the lower part of the lamp in the neighbourhood of the burner which it surrounds. When the burner is in its place the central tube hereinbefore referred to is in such position that it will not interfere with the flame of the lamp, but on the lamp being opened the burner and the flame are drawn down through the tube, which has the effect of instantly extinguishing the flame. Before replacing the lower part of the lamp and the burner, the extinguishing tube is taken out from the upper part of the lamp, and placed over the burner before it is lit, so that the lower part of the lamp with the burner and the extinguishing tube are placed in the upper part of the lamp at one operation, the bridge or the equivalent thereof by which the extinguishing tube is supported being made of a spring which catches on projections to receive and hold it in the required position.

HOLLOWAY'S OINTMENT AND PILLS—RHEUMATIC PAINS, TIC-DOLOREUX.—These diseases are unfortunately very prevalent in this country, and are frequently most distressing, sometimes for years baffling all medical skill to alleviate the sufferings of the victim. In no case have Holloway's ointment and pills failed to produce a cure. The ointment exerts a peculiar and soothing influence over the nerves and muscles, relaxing spasms and subduing pain. The attack soon becomes milder and the intervals between the paroxysms longer; until they cease altogether. The pills restore the body from a weak and debilitated condition to a state of health and strength. Persons bedridden for months with rheumatic pains and swellings, after using the ointment have been cured in an incredibly short period.

* "Mechanical Ore Concentration and Separation." By F. M. F. CAZIN, M.E., of Bernalillo, New Mexico, U.S.A.

AERO-STEAM GENERATORS.

Some few years since it was anticipated that the aero-steam generators would supersede all others, and although this has not hitherto been realised there are still many who retain confidence in the correctness of that principle. Among the most recent inventions of this class is that of Mr. T. LLOYD JONES, of St. Louis, Missouri, which especially relates to that class of generator in which an ordinary fire is employed as the heating agent, and in which the air employed in maintaining the combustion is, together with the gaseous products of combustion, passed directly into the water within the generator, and there retained until the heat of the gaseous and vaporous currents is communicated to the water. The prominent features of the invention are making the currents pursue a circuitous course through the water, the employment of a furnace lined with fire-clay to heat the currents, and causing a vigorous circulation of the water during the injection.

The main furnace chamber is, by preference, outside the shell of the generator. There is an enclosed chamber lined with fire-clay, or other suitable heat-retaining material, which extends around the side and over the top of the said chamber, having openings for the admission of fuel after the fire has been started and for the escape of the heat currents into the generator. There are also other openings respectively for the insertion of fuel for starting the fire, for an eye-class for inspecting the fire, and for the escape of the products of combustion when steam is not being generated. The grate bars of the said furnace chamber are preferably made hollow, opening at both ends into an annular water space provided within a casting attached to the shell of the fire-chamber, which casting forms the base of the same. He provides openings in the shell respectively for the admission of air, for the removal of ashes, for the inspection of the pit, and for the removal of the larger clinkers. He also provides an enclosed fuel hopper, preferably attached to the top of the said furnace, the fuel being introduced into the hopper through an opening which is to be closed when the hopper is full. The dropping of the fuel from the said hopper into the furnace chamber is regulated by means of a valve attached to a rock shaft extending through the shell of the hopper.

For stirring the fuel charge he provides an improved poker, which is constructed of a series of plates, one to each space between the grate bars, arranged vertically in the ash pit, and so that they can be moved up and down between the grate bars. The said plates are suitably connected with levers and a rock shaft, so that they may be conveniently operated. A tube having a cock by which it may be closed when necessary connects the fire chamber with the generator at or above the level of the top of the fire, and passes through a water space that is connected with the main body of water in the generator. The said tube connects at its inner end with a tube, from which depends a series of branch tubes, by means of which the heat currents are distributed in the generator. The said branch tubes are provided with valves, which serve to prevent the water or steam from entering the tubes when air-blast is not in use. Instead of allowing the heat currents to pass directly upward through the water, he causes them to pass through in a circuitous manner, by means of a worm or coil arranged in the water space of the generator, in such a position as to intercept the heat currents. In order to provide for the return of the water urged upward by the heat currents, the said worm or coil is constructed so as not to extend quite to the sides of the generator, and it is enclosed in a casing, leaving a space or flue between the said casing and the shell of the generator. The proportions and form of the said worm or coil may be varied according to circumstances. Instead of a coil or worm, he sometimes uses other means for effecting the same object—such, for instance, as a vertical series of inclined planes, or a vertical series of horizontal partitions open alternately at opposite ends. He can use one or more worms or coils in the same generator.

By dividing the generator into different compartments by means of a partition or partitions, and introducing the heat current or currents into one or a portion only of the said compartments, leaving the other or others to serve as an independent flue or flues for the return of the water the water is kept thoroughly and rapidly in circulation, and thereby brought more effectually in contact with the heat currents. The water is preferably introduced into the generator by passing it from a feeder through a pipe into the said water space around the grate bars, and thence through a pipe into the generator. The coolest water is thereby brought directly in contact with heated surfaces. By means of a pipe provided with a cock, and extending outside the shell of the generator, the condition of the said valves attached to the said branch tubes may be ascertained. The water may be maintained in the generator to above the top of the worm or coil; if desired, however, the full length of the worm need not be used, and the water may be allowed to fall. In such case the water may pass into the space between the coil and the shell of the generator through openings. To prevent the heat currents passing through these openings guards are provided, which are in the form of an annular flange extending around the casing. The fuel hopper may be detached from the furnace chamber, and by means of a crane be swung on one side.

FACILITATING THE MANUFACTURE OF IRON.—The South Staffordshire Mill and Forge Managers' Association, at its last meeting, resumed its discussion, adjourned from the previous meeting, upon Tibbs's Patent Hot-air Chamber, in connection with dry oxide cinder bottoms in mill and other heating furnaces. The hot-air chamber is in the form of a box, constructed so as to cover the flue-hole and prevent the continuous currents of cold air circulating through it into the interior of the furnace. Mr. Tibbs explained that by the employment of the chamber the great desideratum of dry bottoms could be obtained, through the stopping-off of the cold air. The iron was thoroughly heated on the under as well as the top side. Where the chamber was used there was no clogging of the flue-hole. Arrangements were made in the chamber for placing a wagon into which the tap-cinder flowed continuously.—Mr. Morris (general manager of Mr. Wilkinson's Ironworks, Dudley, where the chamber is in use) said that instead of adding a fifth to the weight of the pile in the ordinary way, a sixth only was needed to be added. One mill furnace made sufficient best tap to make bottoms for eight puddling furnaces, and these bottoms stood nine heats; the cinder would fettle two furnaces. No light scrap or sand had now to be bought in the works, and no more mine than was used before the chamber was introduced.—Mr. Matthews said that working off a dry cinder bottom a larger yield to the extent of from 3 qrs. to 1 cwt. was obtained. The quality of the iron produced was also enhanced, for there was no better puddlers' fettling than the tap from the mill furnaces.—Further discussion went to show that where the chamber is used less coal is consumed, the tapping-hole will stand for three or four months without renewal, the chamber takes the place of the flue fire, and it can be placed either in front of the tapping-hole or in the neck of the furnace. Practice pointed to a clear saving, as the result of its use, of 7s. per ton. Mr. Healey, President of the Association, spoke from experience of the great simplicity and utility of the invention, and of the want it had supplied to the ironmaking industry. Such inventions as the hot-air chamber were those that were needed in the present condition of the trade—contrivances which would effect a good saving at no great outlay.

LITTLE COTTONWOOD.—Prospects in Little Cottonwood are said to be as good as they have ever been. The great trouble here as elsewhere, however, is a lack of capital. This scarcity of money cannot arise from a lack of paying mines in which to invest, and a reasonable cause, therefore, is pretty difficult to give. The greater part of the work in the camp is being done by parties leasing mines, who work them on a moderate scale, and in nearly all cases the enterprise of the lessees is meeting with satisfactory results. On Saturday some ore from the Alpha Mine, worked under lease to Mr. Ed. J. Hall, was sold in this city. It ran 135 ounces to the ton, and the prospects of the mine continue exceedingly favourable. Mr. Hall has renewed his lease on the Alpha for another year. The Prince of Wales is also looking very encouragingly. Concentrating on Emma ore is in progress and very fair returns are being made. The Richmond and Teresa Mine is being worked under lease to Mr. E. J. Hall, who has some ten men employed on the mine. In connection with the other workings the low grade ore is being washed, and is netting very nicely, with a result of about 50 per cent. lead and 45 ozs. of silver to the ton.—*Salt Lake Daily Herald, July 26.*

THE "LECHNER" MINING MACHINE.

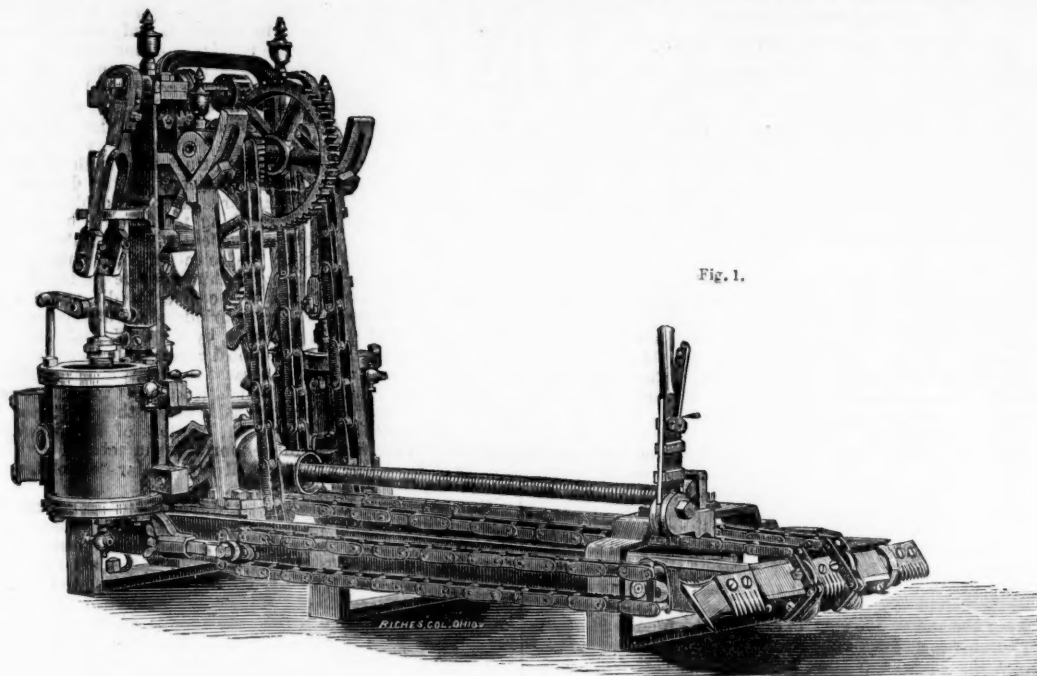


Fig. 1.

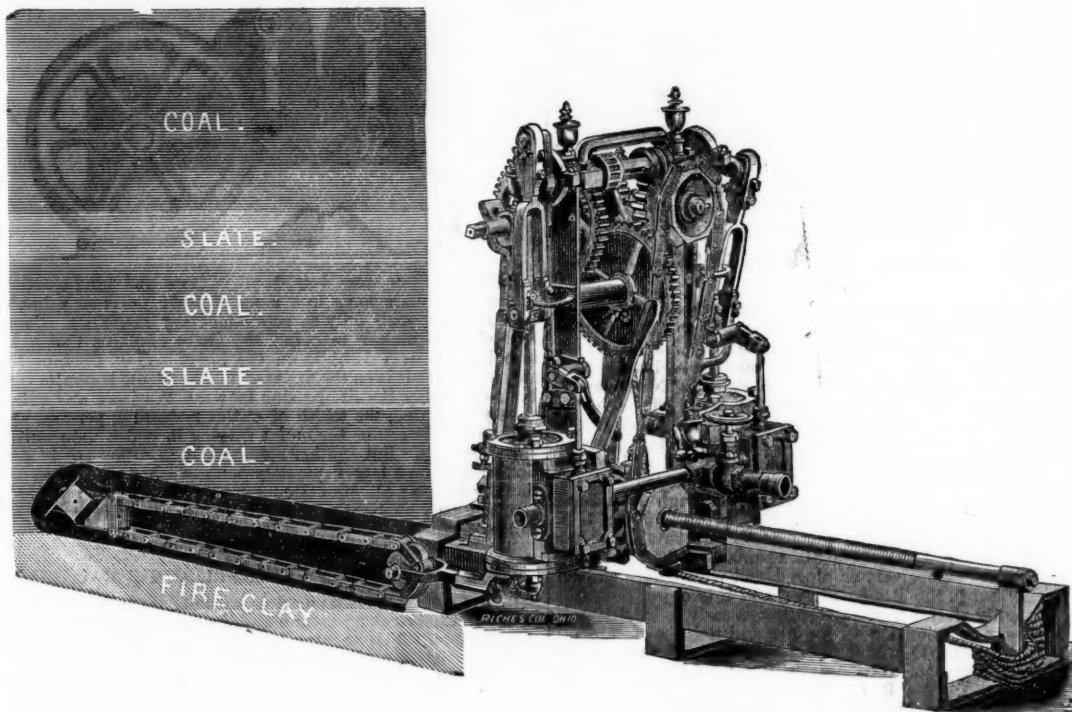


Fig. 2.

THE "LECHNER" MINING MACHINE.

This machine is exhibited at the Paris Exhibition, United States Section, No. 445, Section E1, and is attracting a large amount of attention. As will be seen by the illustration, the machine consists mainly of two frames, one sliding within the other. Fig. 1. showing the machine before being fed out—ready for work. Fig. 2. showing the cut made by the cutter-bar under the coal. On the inner sliding frame is arranged all the gear, the engines, pitch-chains, cutter-bar, and feed-nut. The outer and stationary frame simply carries the sliding frame and feed-screw. The principal dimensions of the machine are—length, 7 ft. 6 in.; width, 3 or 4 ft., according to hardness of the coal; and height, 2 ft. 6 in. With two cylinders, 5½ in. diameter and 5 in. stroke, such a machine makes a cut under a vein of coal, 6 ft. deep, 3 ft. wide (or 4 ft. if coal is soft), and 4 in. high, in eight minutes. The cutter-bar, carrying ordinary steel cutters, is driven by two pitch chains and wheels. The side chains, seen in the illustration, are scrapers, intended to clear the cut of dust and small coal made by the cutters, the driving chains also doing the same service at the same time they drive the cutter-bar. The advantages of this machine over all others are numerous. It weighs only 7 cwt. 2 qrs.; two men can, therefore, handle it with perfect ease. Requires no track, and able to work on the pillar and stall system as readily as on the long wall system. Then the economy in coal is very considerable, since it is able to cut right at the bottom of the seam, taking only 2 in. of coal, or if the fire-clay is dry simply cutting into that.

No other machine is capable of doing the same amount of work in the same time with the same expenditure of power. Requiring no track the work is concentrated in the mine, reducing the dead work to a minimum. These machines have been at work for about 18 months in the Central Ohio Company's Mines, Straitsville, Ohio, United States of America, giving magnificent results, the saving over hand labour amounting to nearly 60 per cent.

A full-sized machine will shortly be tried in competition with other mining machines in the South Hetton Colliery, at Fence Houses. Messrs. Frank Wheeler and Co., 10, Great St. Helen's, London, are the agents for Europe and Australia. They have a similar machine in their office to the one exhibited in Paris.

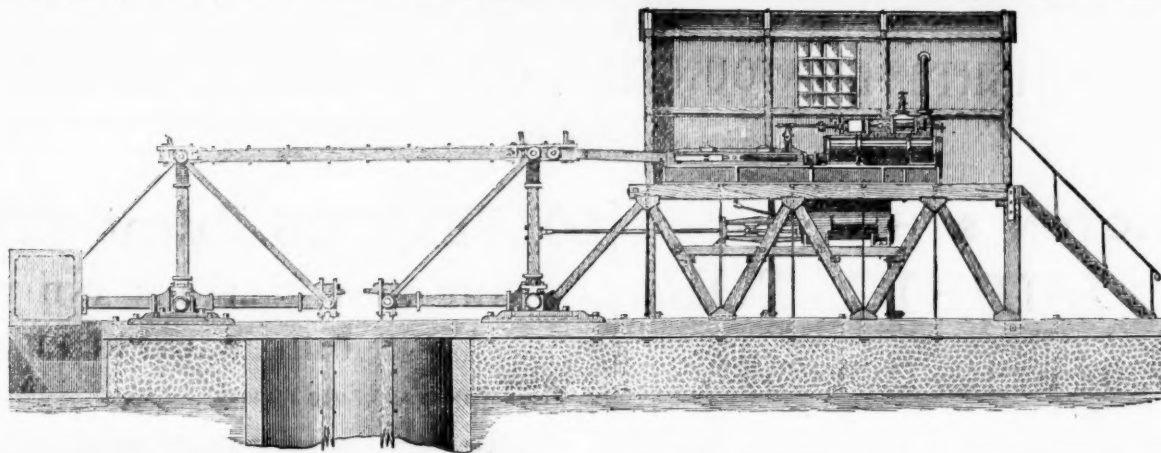
STEAM BOILER FURNACES.—A series of useful improvements in the furnaces of steam boilers has been invented by Messrs. WIGZELL, POLLIT, and LEES, of Sowerby Bridge, Yorkshire. The invention relates firstly to reciprocating furnace bars, or bars which have a sliding motion communicated to them for the purpose of propelling the fuel forward in the furnace, and consists in constructing such bars with a raised part or enlargement at the front end, which raised part acts as a pusher for forcing the fuel from the hopper, thus dispensing with separate plungers and mechanism for working the same. The second part of the invention relates to the method of operating the reciprocating bars. For this purpose they employ a new arrangement of mechanism consisting of a cam shaft in front of the furnace, which propels the whole of the bars forwards into the furnace at once. On the underside of the bars are notches or recesses for the reception of cross bars which serve to draw out the furnace bars. Each of these cross bars operates upon one-half of the grate bars by removing each alternate one, the cross bars being themselves operated by cams on the end of the cam shaft. By this arrangement any bar can be taken out and replaced without disturbing the operating mechanism. Thirdly, the invention re-

lates to the construction of the back fire-bridge of furnace, which is composed of fire-brick, fire-clay, asbestos, or other fire-resisting material, these materials being cast in or encased within cast-iron.

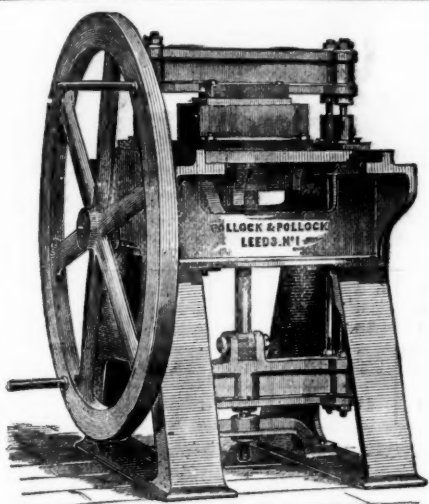
ROTARY PUMPS.—The desirability of a pump which is effective in operation and comparatively inexpensive in manufacture can scarcely be doubted, and the production of a pump combining these advantages is now claimed by Messrs. MILBRAHAM, of Philadelphia. They use a single grooved cylinder, having the corners or edges of the grooves rounded off in combination with packing strips attached to the base or pump case, and with vane drum. The invention also includes the combination of a water-tight wheel case and bearings with the pump case for enclosing the gear wheels and the journals water-tight, and in the bushings and bearings having a passage between their walls connected with a hole through the upper side of the bearings, and a hole through the lower side of the bushings for oiling the journals when under a water pressure. At the middle lower part of a pump case, provided with inlet and outlet openings is placed a cylinder, the opposite sides of which have grooves formed in them for the passage of the wings or vanes of a drum placed in the middle upper part of the said pump case. The grooves do not extend to the centre of the said cylinder, and the corners or edges of the said grooves are rounded or bevelled, so that the vanes can pass in and out freely, and so that the convex surface of the said cylinder on one side of the said grooves may come in contact with the convex surface of the drum before the vane has passed out at the other side of the said grooves to adapt the pump to be operated with a single grooved cylinder. To the base of the pump case are attached two packing strips to bear against the convex surface of the grooved cylinder, to prevent any back flow of the water, which strips are so placed that one of the other may always be in contact with the said convex surfaces. The journals of the vane drum and grooved cylinder are geared together by toothed wheels, so that the said drum and cylinder must always revolve with equal velocity, and may be thus kept always in gear with each other. The journal of the vane drum is made to project, and to it is applied the power for driving the pump. The gear wheels are enclosed with a water-tight case, which is provided with a single stuffing-box through which the journal of the vane drum projects to receive the driving power. The bearings of the drum and cylinder are cast solid with the heads of the drum and wheel-cases, or may be cast with flanges and bolted water-tight to the said heads. The former construction is preferred, as being less expensive and troublesome in manufacture. The journals of the vane drum and grooved cylinder revolve in bushings placed in the bearings. In the outer surface of the bushings or in the inner surface of the bearings are formed ring grooves to serve as a passage way and reservoir for oil, which is poured in through a hole or oil cup in the upper side of the bearings. In the lower side of the bushings are formed one or more holes through which the oil passes or is drawn to the said journals, which journals rest upon the inner orifices of said holes, and thus prevent the water from passing into the passages. This construction enables the journals to be oiled when under a water pressure. By making the wheel case and the bearings water-tight, and providing a means for oiling the journals when under a water pressure, there will be only one stuffing box to be made, fitted, and kept packed, which greatly lessens the cost of manufacture and the running expense of the pump. The bushings are kept from turning in the bearings by lugs formed upon their outer ends, and which enter notches in the outer ends of the said bearings.

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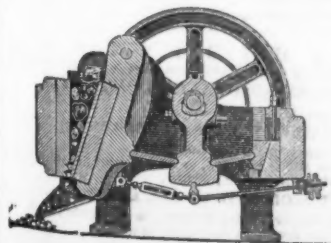
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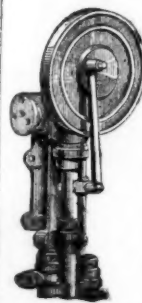
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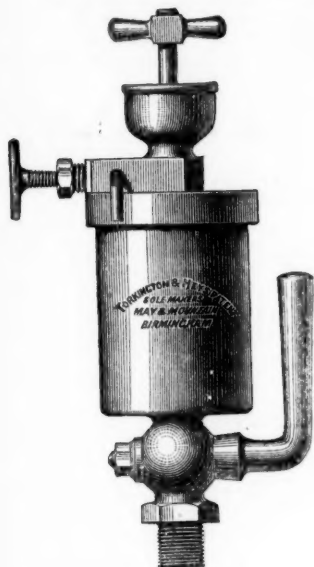
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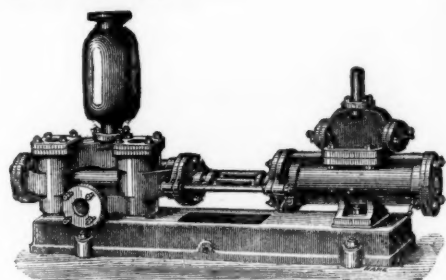
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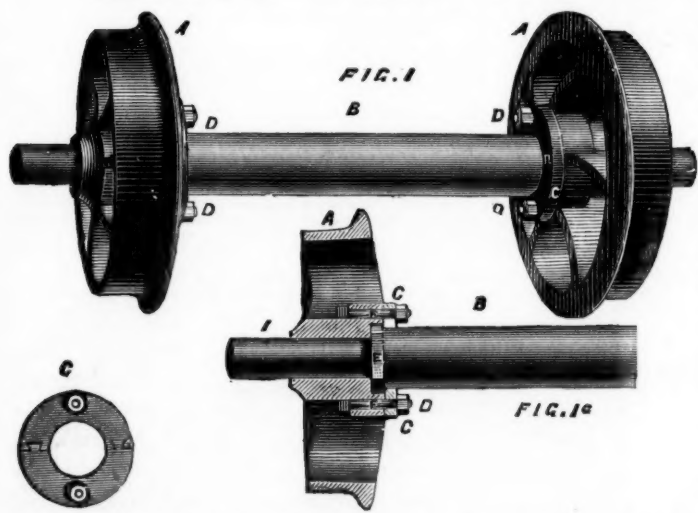
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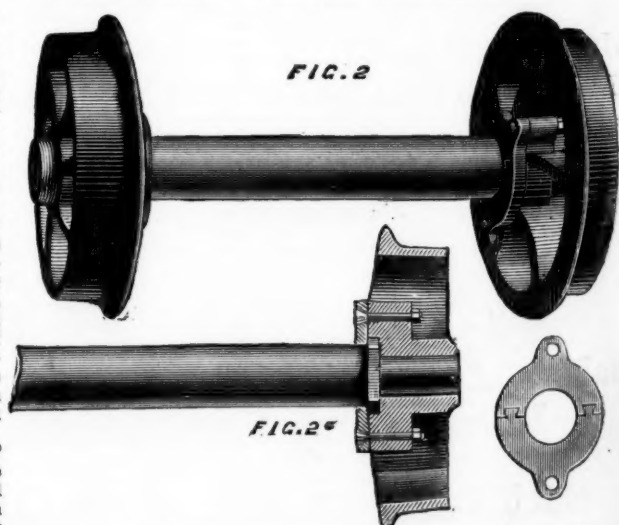


Figs. 1 and 1a show a longitudinal view and plan of a pair of corf wheels and axles fitted up for outside bearings, and Figs. 2 and 2a for inside bearings. A A are the wheels; B, is the axle; C C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle, which is forged of solid steel; the axle is secured into the recess partly by being sufficiently tightly fitted to require driving home with a hammer, and partly by the washer. Around the axle adjoining the boss is fixed the washer, made in two parts and dovetailed, so as to allow of being fixed after the collar has been forged on the axle. The washer is secured to the boss by bolts and nuts, both in outside and inside bearings; in the case of inside, by means of lugs cast on the boss, and the washer made of corresponding shape; the washer is made of crucible cast steel. The only tool required for fitting is an ordinary spanner for outside bearings, and a box spanner for inside bearings.

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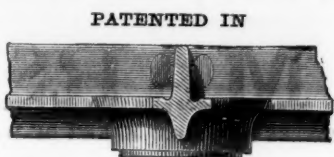
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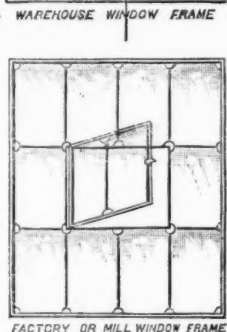
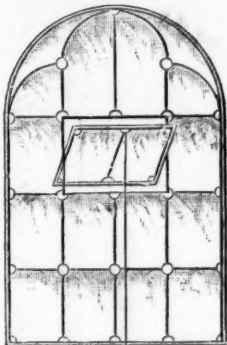
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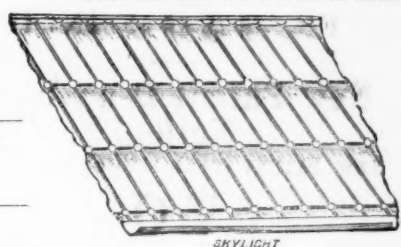
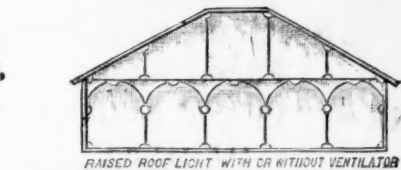


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Manufacturers of all kinds of Shipbuilders', Engineers', Coach, Wagon, and Fish Bolts; Coach Screws; Railway Spikes and Brobs; Hot-pressed and Forged Nuts, Rivets, Washers, &c., &c.

SHIPBUILDERS' AND RAILWAY STORES' CONTRACTORS.



IMPORTANT.

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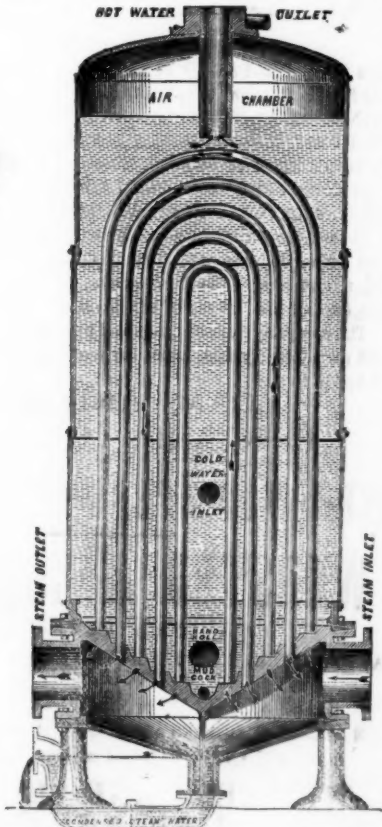
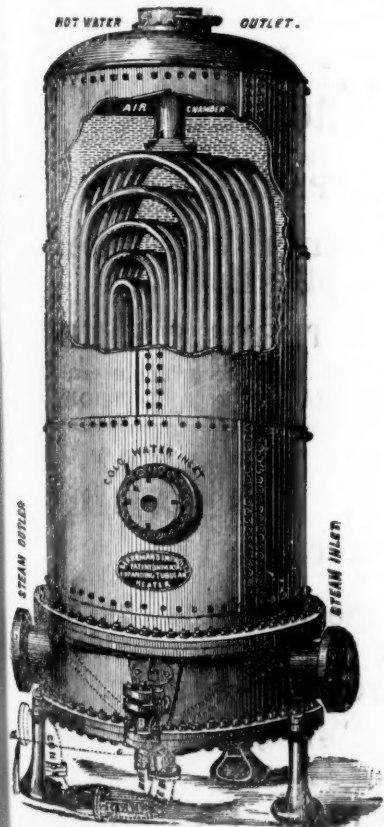
(LIMITED),

NEPTUNE FORGE ENGINE
AND BOILER WORKS,

TIPTON,

STAFFORDSHIRE,

AND AT 147, QUEEN VICTORIA STREET, LONDON, E.C.



Having purchased the Engineering Business lately carried on by R. BERRYMAN AND CO., at 23, Congreve-street, Birmingham, and 28, Wilson-street, Finsbury-square, London, have removed the whole to their Works at TIPTON, to which place ALL COMMUNICATIONS SHOULD IN FUTURE BE ADDRESSED, and where the BERRYMAN HEATER can be seen at work, and in every stage of manufacture.

Being the SOLE MAKERS and PATENTEES of these CELEBRATED COAL SAVERS and EXHAUST STEAM UTILISERS, and having remodelled and greatly improved them, adding largely to their HEATING SURFACE and WATER CAPACITY, J. W. and Co. have put down a special plant, which includes an entire new set of improved patterns, enabling them to offer these FEED WATER HEATERS to the public at

GREATLY REDUCED PRICES.

This arrangement of BRASS TUBES of a great length giving an enormous HEATING SURFACE makes this HEATER not only the MOST POWERFUL ever invented, but its FIRST COST PER FOOT OF HEATING SURFACE IS LESS THAN HALF THAT OF ANY OTHER. It will condense the whole of the Exhaust Steam from the Engine if required, and entirely does away with the NOISE and BACK PRESSURE from exhaust pipes.

ALL THE TUBES ARE OF SPECIALLY PREPARED SOLID DRAWN BRASS AND COPPER; both ends are expanded into the bored holes of the same Tube Plate, METAL TO METAL, and every tube is free to expand and contract independent of each other. Leakage is impossible, as, when the tubes are once fixed, nothing short of cutting out will remove them. No scurf adheres to the tubes because of the difference of expansion between SCURF and BRASS. The inside of the Heater can be washed out by means of the mud cock and hand hole whilst at work.

Only one pump or injector is required, and as the Heater is placed between the pump and the boiler, the water is forced, COLD, into it, and passes out at the top HOT into the boiler direct. Where the WATER WORKS PRESSURE is sufficient no pump or injector is needed.

The water being heated to BOILING POINT UNDER PRESSURE in the Heater, a saving of from 20 per cent. to 25 per cent. in fuel is effected; the disastrous results of grease in boilers are also avoided, Every part can be lined with BRASS, COPPER, or LEAD, as may be required in special cases for heating water or any kind of liquor in large quantities for CHEMICAL WORKS, BATHS, WASH- HOUSES, AQUARIA, GREENHOUSES, BREWERIES, WOOL WASHING, DYE WORKS, TANNERIES, &c., &c.; they will also HEAT AIR FOR CUPOLAS AND BLAST FURNACES, and are now at work as INTERHEATERS for compound engines with direct steam from the boiler with a further saving of 15 per cent.

The New Price List, with detail information, is now ready, and will be sent on application, together with an Illustrated Catalogue, with references and testimonials from Firms using FOUR HUN- DRED AND THIRTY-THREE of these Heaters.

H. R. MARSDEN will exhibit in full operation at the Manchester, Liverpool, and North Lancashire Show, at Lancaster, September 3rd to 5th, one of his

New patent Stone Breakers, with Screening Apparatus,

And on wheels to travel; also fitted with his NEW PATENT TOGGLE BEARING AND DRAWBACK MOTIONS, and REVERSIBLE PATENT FACED BACK CUBING JAWS in sections.

Stones broken equal, and Ores better, than by hand, at one-tenth the cost.

H. R. MARSDEN,

ORIGINAL PATENTEE AND SOLE MAKER OF BLAKE'S

Improved Patent Stone Breakers & Ore Crushers.

New Patent Reversible Jaws,
in Sections, with Patent
Faced Backs.

NEW PATENT ADJUSTABLE
TOGGLES.

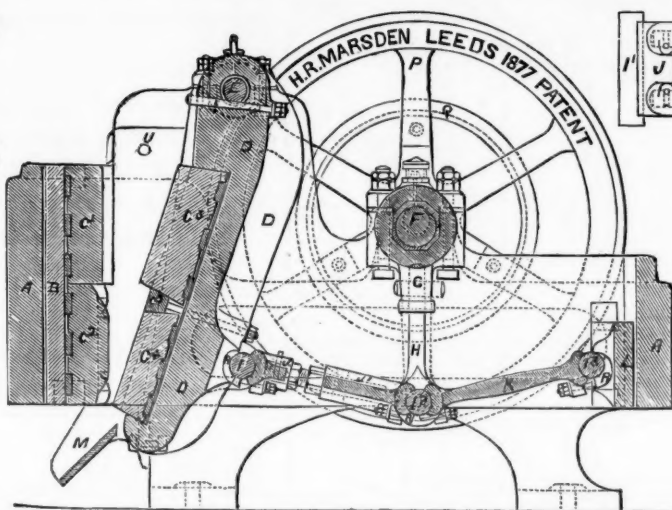
OVER 2500 IN USE.

New Patent Draw-back
Motion.

NEW PATENT STEEL TOGGLE BEARINGS.

70

PRIZE MEDALS.



READ THIS—

Wharhole Lime Works, Maryport, Whitehaven,
November 7, 1878.
H. E. MARSDEN, Esq., Soho Foundry, Meadow-lane, Leeds.
DEAR SIR,—The machine I have in use is one of the large
size, 24 in. by 12 in. The quantity we are breaking daily with
this one machine is 250 tons, the jaw being set to break to a
size of 2½ in. We have, however, frequently broken over
300 tons per day of ten hours, and on several occasions over
380 tons during the same period. The stone we break is the
blue mountain limestone, and is used as a flux in the various
ironworks in this district. We have now had this machine in
daily use for over two years without repairs of any kind, and
have never had occasion to complain of any inconvenience in
using the machine. I hope the one you are now making for
me may do its work equally well. The cost—including EN-
GINE-POWER, COALS, ENGINEMAN, FEEDING, and all EXPENSES
OF EVERY KIND—is just 8d. per ton. Should any of your
friends feel desirous of seeing one of your machines at work,
I shall have much pleasure in showing the one alluded to.
I am, dear Sir, yours very truly,
WILLIAM MILLER.

AND THIS—

Wharhole Lime Works, Aspatria, Cumberland,
July 11th, 1878.
H. R. MARSDEN, Esq., Soho Foundry, Leeds.
DEAR SIR,—We are in receipt of your letter of 4th inst. I
may just state that the stone breaker above named has been
under my personal superintendence since its erection, and I
have no hesitation in saying that it is as good now as it was
five years ago.
I am, dear Sir, yours faithfully,
FRANCIS GOULD.

GREATLY REDUCED PRICES ON APPLICATION.

ALL BEARINGS are renewable, and made of H.R.M.'s Patent Compound ANTIFRICTION METAL.

CATALOGUES, TESTIMONIALS, &c.

H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.

TO COLLIERY AND MINE OWNERS.

R. HUDSON'S PATENT STEEL CORVES OR "TRAMS."

Patented July, 1875, and January, 1877.

Entire new principle, saving three-quarters to 2 cwt. "dead" weight per corve. Will hold 2 to 3 cwt. more coal than the ordinary kind, without increasing the outside dimensions. Adopted by—
Messrs. THOMPSON, WISE, & Co., Burry Port, South Wales.
Messrs. DYMOND'S Liversedge Coal Company, near Leeds.
Messrs. W. ACKROYD and Bros., Morley, near Leeds.
Messrs. CLAYTON and SPRIGHT, Farnley, near Leeds.
Messrs. JAS. WORMALD and SONS, Rawdon, near Leeds.
KINGSWOOD COAL and IRON CO., near Bristol.
MIDDLETON COLLIERY CO., near Leeds. | NEWTON COLLIERY, near Castleford. | Messrs. RUSHFORTH and Co., Adwalton, near Leeds. | Messrs. JAS. FUSSELL, SONS, and Co., Frome, Somersetshire.
Messrs. BARING, GOULD, & ATKINSON, Diamond Fields, South Africa.
Messrs. KIMBERLEY, Diamond Mines, South Africa.
Mr. HASELDEN'S Lead Mines, Linares, Spain.
FRYTON COLLIERY CO. (Limited), Castleford, near Leeds.
HOWDEN CLOUGH COLLIERY CO. (Limited), near Leeds.
T. VAUGHAN and Co.'s TRUSTEES, South Medomsley Colliery; and others.
R. HUDSON, Engineer and Ironfounder, Gildersome Street Foundry, near Leeds (Five minutes walk from Gildersome Station, G.N.R.)

The Barrow Rock Drill COMPANY

Are NOW PREPARED to SUPPLY their DRILLS, the ONLY
ONES that have been SUCCESSFULLY WORKED in the
MINES of CORNWALL. At DOLCOATH MINE, in the
HARDEST known ROCK, a SINGLE MACHINE has, since
its introduction in July, 1876, driven MORE THAN THREE
TIMES the SPEED of HAND LABOUR, and at TWENTY PER
CENT. LESS COST PER FATHOM.

In ordinary ends two machines may be worked together,
and at a proportionately increased speed. They are strong,
light, and simple, easily worked, and adapted for ends and
stopes, and the sinking of winzes and shafts.

The company are also prepared to SUPPLY COMPRESSORS,
and all necessary appliances for working the said Drills.

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LOAM AND SON,
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IMPROVED STEEL WIRE FOR ROPES.

WEBSTER & HORSFALL,

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MANUFACTURERS OF IMPROVED STEEL WIRE FOR ROPES
FOR COLLIERIES,

RAILWAY INCLINES, PLOUGHS, HAWSERS, &c.

SOLE MANUFACTURERS of the HOMOGENEOUS WIRE for the
ATLANTIC CABLES of 1865 and 1866.

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MINE AND QUARRY STANDS, STEEL DRILLS, SPECIALLY PREPARED INDIARUBBER HOSE, TESTED
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Air-Compressing Machinery,

Simple, strong, and giving most excellent results, and
ELECTRIC BLASTING APPARATUS.

Full particulars of rapid and economical work effected
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CONTRACTS TAKEN, OR SPECIAL TERMS FOR HIRE.

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THE ROANHEAD ROCK DRILL.

BY ROYAL LETTERS PATENT.

This justly-celebrated Rock Drill, the only one invented that will
work in the hardest rock without more than the usual repairs re-
quired by any ordinary machinery, is now offered to the public.

It has been most successfully worked in the well-known Hematite Mines of Lancashire and Cumberland. Will drive 50 to 60 ft.
in hard rock without change of drill, and can be worked by any miner, and kept in repair by any blacksmith. It is the most
simple rock drill ever invented, and cannot with fair usage get out of order.

Plans, Estimates, including Compressors, and all other Mining Machinery, supplied on application to the sole makers,—

SALMON, BARNES, AND CO.,
MINING ENGINEERS.

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J. WOOD ASTON AND CO., STOURBRIDGE

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Manufacturers of

CRANE, INCLINE, AND PIT CHAINS,

Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES
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Orab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions.
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